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ABSTRACT

The monographs in this volume profile current information on basketball, covering a wide variety of topics regarding teaching, coaching, and playing girl's and women's basketball. Ten articles cover aspects of basketball ranging from history to nutrition and conditioning to techniques for high level competition. The titles and authors are as follows: (1) "Women's Intercollegiate Basketball: A History" (Joanna Davenport); (2) "The Female Coach: The Pressure Is On" (Connie M. Thorngren); (3) "Aggressive Behavior: Part of the Game or Part of the Problem" (M. Kathleen Ryan); (4) "Fit the Game to the Player" (Carolyn Lehr); (5) "Teamwork" (M. Karen Ruder); (6) "Nutrition and Its Application to Basketball" (Mildred Barnes); (7) "Coaching Hints for Developing a Post Player" (Anita Palmer); (8) "Looking" Better for Basketball (Darlene A. Kluka, Angela B. Lawson, and Phyllis A. Love); (9) "How Does Your Flexibility Program Rate?" (Mildred Barnes); and (10) "Strength and Conditioning for Women Basketball Players" (MaryBeth Horodyski, Amanda B. Hopkins, and Thomas J. Koesterer). (LL)

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BASKETBALL MONOGRAPHS

Ideas for Today's Game

Edited by

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Sponsored by
National Association for Girls
and Women in Sport

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Purposes of the American Alliance for Health, Physical Education, Recreation and Dance

The American Alliance is an educational organization, structured for the purposes of supporting, encouraging, and providing assistance to member groups and their personnel throughout the nation as they seek to initiate, develop, and conduct programs in health, leisure, and movement-related activities for the enrichment of human life.

Alliance objectives include:

1. Professional growth and development—to support, encourage, and provide guidance in the development and conduct of programs in health, leisure, and movement-related activities which are based on the needs, interests, and inherent capacities of the individual in today's society.
2. Communication—to facilitate public and professional understanding and appreciation of the importance and value of health, leisure, and movement-related activities as they contribute toward human well-being.
3. Research—to encourage and facilitate research which will enrich the depth and scope of health, leisure, and movement-related activities; and to disseminate the findings to the profession and other interested and concerned publics.
4. Standards and guidelines—to coordinate and administer a planned program of professional, public, and governmental relations that will improve education in areas of health, leisure, and movement-related activities.
5. To conduct such other activities as shall be approved by the Board of Governors and the Alliance Assembly, provided that the Alliance shall not engage in any activity which would be inconsistent with the status of an educational and charitable organization as defined in Section 501(c)(3) of the Internal Revenue Code of 1954 or any successor provision thereto, and none of the said purposes shall at any time be deemed or construed to be purposes other than the public benefit purposes and objectives consistent with such educational and charitable status.

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NAGWS is the only national professional organization devoted exclusively to providing opportunities for girls and women in sport-related disciplines and careers. For nearly 100 years, since 1899, NAGWS has been the primary educational organization dedicated to:

- developing and promoting women for sport leadership positions
- advocating women's full participation in sport and physical activity
- initiating and enhancing quality programs for all females
- generating awareness about the profession.

Over 10,000 teachers, coaches, trainers, athletic directors, administrators, and sport officials now help shape the future of the profession as members of the National Association for Girls and Women in Sports. NAGWS is fighting to increase the number of women in coaching and sport leadership; fighting to make every career opportunity available; and fighting to bring quality where it is long overdue.

Accomplishments of NAGWS include the following:

- annually, 200,000 girls and women across the nation participate in National Girls and Women in Sport Day, cosponsored by NAGWS
- NAGWS annually awards the Wade Trophy to the country's most outstanding senior collegiate female basketball player
- as part of NAGWS, the Affiliated Boards of Officials trains, rates, and oversees officials for women's collegiate volleyball
- for the past 25 years, NAGWS has been addressing sport and gender issues with the U.S.Olympic Committee

Services provided to members include the GWS News, a speakers bureau, political action on Capitol Hill, year-round job placement assistance, student participation and internships, NAGWS publications (with discounted rates), an annual convention, and six district conventions.

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Preface

There is no doubt that basketball is the most popular sport in most girls and women's athletic programs in high schools and colleges today. This volume of monographs is an attempt to profile current information on this sport, covering a wide variety of topics regarding teaching, coaching, and playing girls and women's basketball.

The material should be of interest to coaches, players, and officials. The ten articles cover aspects of basketball ranging from history to nutrition and conditioning to techniques for high level competition.

The editors wish to thank the many authors who took the time and effort to contribute to this publication. Appreciation is also expressed to NAGWS for endorsing and supporting this project.

Joanna Davenport
Marlene Adrian

About the Authors

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Women's Intercollegiate Basketball: A History

Joanna Davenport

Before James Naismith invented the game of basketball in 1891, intercollegiate competition for women was practically nonexistent. The game was quickly adopted by women's colleges and spread like wildfire throughout the country. Soon women's basketball teams were playing other schools at both the high school and college level. No other sport for girls and women has been received with such enthusiasm, grown to such proportions, created so many problems, been involved in so much controversy, and influenced the course of history of women's athletics as has basketball. In other words, as the story of intercollegiate athletics for men revolves around football, the story of intercollegiate competition for women revolves around basketball.

As we celebrate the 100th anniversary of the invention of basketball, it might help coaches and players if they know about the evolution of the game that is now the most popular intercollegiate sport for women. Furthermore, an examination of some of the rules will illustrate how changes in attitudes plus changes in play necessitated modifications of the rules and regulations. The interrelation between the two is undeniable; different play and attitudes influence changes in rules, and conversely, changes in rules have a great effect on the way the game is played.

In the early 1890s Luther Gulick, director of the Physical Education Department at the Young Men's Christian Association Training School in Springfield, Massachusetts, asked instructor James Naismith if he could possibly design a game that would be as interesting and exciting as football and yet be played indoors. After several unsuccessful experiments Naismith designed an activity that he called basketball, and the first game was played in 1891 (Naismith, 1941). The now famous peach baskets were erected as

goals, and the 13 basic rules formulated were posted on the bulletin board. Naismith later stated that he planned the game with the following five fundamental principles in mind:

1. There must be a ball; it should be large, light, and handled with the hands.
2. There shall be no running with the ball.
3. No man on either team shall be restricted from getting the ball at any time that it is in play.
4. Both teams are to occupy the same area; yet, there is to be no personal contact.
5. The goal shall be horizontal and elevated (Naismith, 1941, p. 62).

These five principles are still the basic structure of men's and, more recently, of women's basketball today.

It was obvious the first time girls and women played basketball that many did not have the strength or stamina to play the game as Naismith had designed it. Thus, the women modified the game and these changes were the beginning of different sets of rules being used by girls and women throughout the United States. At Smith College, which is credited with being the first women's college to play basketball, the rules were changed shortly after the game was introduced by its director of physical education, Senda Berenson. In an 1894 article, Berenson wrote that in order to control roughness and to encourage teamwork she made these modifications:

1. The court was divided into three zones and players had to stay in their respective zones.
2. No snatching of the ball was allowed.
3. Only a three-bounce dribble was allowed.
4. The ball could only be held three seconds (Berenson, 1894, pp. 106-109).

She also stated that she felt basketball fostered physical courage, self-reliance, quickness, self-control, and gentle manners.

Many colleges used the rules as played at Smith while other institutions either made entirely different changes or continued to use men's rules. Regardless of which rules were used, the game spread rapidly and the sport of basketball was the beginning of the intercollegiate competition for women. Even though the following description is about a class game at Smith, note

these remarks by Berenson about the popularity of basketball:

> We thought that just a few students would come to watch, but the whole college with class colors and banners turned out. They filled the broad balcony.... They stood along the walls.... The cheering and screaming...was a high pitched sound I do believe no one had ever heard before.... The next day the local paper [had]...a lurid description that must have made the staid citizens of the [area] wonder whether Sophia Smith had been wise to found a college in which young women might receive an education equal to that accorded to young men. (Hill, 1941, p. 662)

When schools competed against each other, there was often controversy when one played by the men's rules and the other institution used a three zone rule. Another controversial rule was the "snatching" clause whereby in the men's game a ball could be taken from another player. Some women's rules allowed snatching while others did not. Dudley Sargent (1896), writing about a game between his players of the Sargent Normal School who did not use snatching against the ladies of New Haven who did, stated that the first half was played with the New Haven rules—with snatching—and the last half was played using Sargent rules—without snatching (p. 12).

Thus, there was a lack of continuity as the game spread from area to area. Many schools and colleges published material concerning the game and different sets of rules appeared in print all over the country. It soon became apparent that an attempt should be made to standardize the game. Thus, in 1899, at a physical training meeting held in Springfield, Massachusetts, a committee was appointed to study the women's basketball situation throughout America. The task of this committee was to try to put all the modifications of the game into one set of rules that would be suitable for girls and women.

It is important to realize that this was the first time in our history that a national committee was established in regard to women's athletics. This basketball committee, ongoing since its inception in 1899, became in 1905 an official part of the American Physical Education Association, known today as the American Alliance for Health, Physical Recreation, Recreation and Dance (AAHPERD). It was the forerunner of the present day National Association for Girls and Women in Sports (NAGWS).

The committee formulated the first "official" girls basketball rules, which were published in a guide for the first time in 1901. The controversial rules were examined carefully and the following regulations were declared as official:

1. The court shall be divided into three equal parts.
2. Snatching and batting of the ball is not allowed.
3. Holding the ball longer than three seconds constitutes a foul.
4. There shall only be a three bounce dribble.
5. There may be 5–10 on one team (Berenson, 1901, pp. 28-43).

Even after this first basketball guide was published, conditions were still not the same throughout the country. The rules of the game, as written in the guide, were either interpreted differently in various regions or were completely ignored in others.

The biggest problem for many years was the controversy over women playing by men's rules. As the women leaders made modifications of the original game, the rules changed so completely that the two games were not alike at all. Since many of the early coaches of girls and women were men, it was natural that they wished their teams to play by men's rules. Furthermore, some women coaches preferred the men's game as they felt it was a more stimulating and interesting way to play. The skillful player, they claimed, felt hampered and restricted by the women's rules. This point is perfectly illustrated by these remarks in a 1914 article:

> Nearly all the Eastern prep schools and colleges change the existing "Rules for Women" somewhat to suit their own conditions while in the West and the South quite different types of the game are played. Many teams play "Men's Rules" making it necessary for a school playing other schools to play that game as well...five different sets of printed rules exist for girls...most widely used are the "Women's Rules" and "Men's Rules" [of] Amateur Athletic Union. (Stewart, 1914, p. 214)

By 1920, conditions were illustrated by these remarks: "The time has come when basketball for women ought to be changed. Women in the past decade have increased tremendously in strength, energy and coordination while the game has not changed in its science in proportion to the increase" (Richards, 1920, p. 411). Richards went on to say that the rules of the game did not allow the women to play in a quick, skillful manner. She followed with a colorful account of games overshadowed by roughness and ended with this sentence: "It is not the quickest, most skillful or most scientific that wins, it is either the team that has the tallest players or that exhibits the most brutal force." Richards felt very strongly against the three-court zone, as she believed it

hindered team play. Her greatest objection, as indicated above, was to the roughness. She elaborated by declaring, "I have seen girls come out of games black and blue with digs they have gotten."

Since roughness in the games seems to have been a common complaint at all levels, it is important to mention that Naismith always pointed out the fact that "those who complain of the roughness of basketball surely do not interpret the rules correctly, for there is not a single provision that allows any personal contact between players" (p. 369).

In contrast to all those wishing a faster two-court game and exciting contests, there were many women who disapproved of a quicker game and keen varsity competition due to the so-called abuses occurring in basketball. Some of these abuses were: playing for gate receipts; receiving all kinds of publicity, mostly adverse; emphasis on winning at all costs; being coached and officiated by men; poor chaperoning; and no standards concerning the welfare of the players. Using their influence, these leaders brought about almost a complete halt to intercollegiate competition and a contest known as a play day was introduced as a substitute. In the play day format the two competing teams were a mixture of members from each school so the emphasis was less on winning and more on having fun and getting to know each other.

But some schools did not quickly choose the play day concept, and it evolved slowly in some sections of the country. However, by 1923, based upon a survey, it was evident that most women's colleges had switched to play days; 93% of the physical educators polled were opposed to any intercollegiate competition. Interestingly, the findings indicated that in the few colleges where there were varsity contests, the usual sport was basketball (Lee, 1923, p. 255). In the 1930s other surveys were conducted and 80% of the colleges were found to have play days or intramurals.

In the 1930s, however, some significant rule changes indicated a change in attitude about the amount of activity in which a female could participate and a reduction of restrictive rules, so the game was quicker, improving the caliber of play considerably. First, guarding on any plane became legal; previously, only guarding on the horizontal had been allowed. Second, the ball could be dribbled at any height; before, it had to bounce as high as the knee. And the most dramatic change occurred in 1938. The two division court that had been allowed on small courts since 1914 became the official game for all size courts. Each team would now consist of three forwards who made points and three guards who passed to their forwards and prevented the opponents from scoring (Meissner, 1938, p. 10).

In the 1940s the rules were relatively stable, and wartime conditions had the effect of modifying or completely eliminating intercollegiate competition. By the end of the decade, however, most colleges had some form of intramurals, and by 1955, 50% of women physical educators in one poll favored intercollegiate competition. Rules were changed in that the forwards were allowed in the key for only three seconds instead of unlimited time, as it was obvious players were becoming more skillful.

Incredible changes in most facets of our society occurred in the 1960s. Girls and women's sports were not exempt. The extent of these changes was such that the era could be entitled the "Change of Heart Era." First of all, NAGWS had had the philosophy, "a sport for every girl and a girl for every sport." In the early 1960s NAGWS dramatically committed itself to also providing for the highly skilled and in 1967 established the Commission for Intercollegiate Athletics for Women (CIAW) whose main role was to sponsor national championships (Lee, 1983, p. 313). Furthermore, in cooperation with the United States Olympic Committee (USOC) coaching institutes were held to provide teachers and coaches with necessary skills to work with the highly skilled athletes. Two of these institutes covered women's basketball and basketball officiating. The girls and women's basketball game also had dramatic changes that were the forerunner of our present five-player, full-court game.

In 1966, the unlimited dribble became official (Barnes, 1966, p. 117). This return to the original rule was the culmination of years of changes from Naismith's unlimited dribble, to a three bounce dribble, to no dribble, to one dribble, to two dribbles, to three dribbles, and then back to the unlimited dribble.

Next, in 1961, a new rule was introduced as experimental that was almost as revolutionary a change as the two-court game adopted in 1938. Each team was allowed to have two roving players who played the entire length of the court. It was explained that the Basketball Committee had conducted experimentation about the rule and the results were interpreted that the roving player game "provided more opportunity for team play and that it encouraged all players to develop the skills of shooting and both defensive and offensive tactics" (Winsberg, 1961, p. 117). To prepare the women's basketball coaches and players for the change, the *1960-1961 Basketball Guide* featured an article entitled "The Question of the Roving Player" (Sayre, 1960, p. 29). The author indicated that the roving player game is "...definitely a more active game for the highly skilled player who is searching for a competitive type game." The Basketball Committee explained that waiting until 1962 for the roving player game to become official would allow enough time for new

institutional materials in team play and strategy to be developed. The *1962-1963 Basketball Guide* featured articles, such as "The Roving Player Game" and "Play Drills for Roving Player Game," to help coaches and players play the "new" game (Winsberg, 1962, pp. 15-28).

Finally in 1971, the five-player game and the 30-second clock were official. A year later, Mildred Barnes in her book *Women's Basketball*, written especially for teachers, coaches and players to learn the five-player game, remarked that women's basketball certainly had undergone remarkable changes in a relatively short time—from six players with a divided court, to six players with two rovers, and finally after two years of experimentation, to a five-player game (p. xi).

Coincidentally, in the 1970s Title IX was approved, and NAGWS expanded its CIAW to the Association for Intercollegiate Athletics for Women (AIAW), which was the governing body for intercollegiate athletics for women. Soon there was an explosion of expanded sports programs for women. Many colleges and universities decided not to have broad-based programs with many sports and put all the emphasis and financial support on the sport that received the most media attention — basketball. Thus, many small, not as well-known colleges became the national powers in women's basketball as they became the winners in the newly sponsored AIAW National Basketball Championships.

As the caliber of play increased, many dramatic events took place involving women's basketball.

- In 1976, women's basketball for the first time became a sport in the Olympic Games, and the United States won the silver medal (Hill & Baron, 1988, pp. 64-65).
- In 1979, Ann Meyers, from UCLA and a member of the first Olympic team, became the first woman to sign with a National Basketball Association (NBA) team. She signed a one year contract with the Indiana Pacers but never played in a game (Hill & Baron, 1988, p. 65).
- In 1985, Lynette Woodard became the first female player for the Harlem Globetrotters.
- And in 1986, Nancy Lieberman became the first woman to play on a men's professional team, the Springfield Fames.
- In 1981, AIAW was dissolved and women's intercollegiate athletics was incorporated into the men's athletics governing body, the National Collegiate Athletic Association (NCAA).

As the year 2000 nears, basketball is still the most popular intercollegiate sport for women. In most Division I schools the coach of the women's basketball team in women's athletics makes the highest salary and has the largest operating budget. Athletic departments that are forced to drop sports due to financial conditions rarely, if ever, drop basketball. The media gives the most exposure to women's basketball and not only are the National Championships on TV, but also selected games during the season.

Today, outstanding women players who have finished their collegiate eligibility are receiving six figure salaries to play basketball in Europe, Japan, and Scandinavia. Hopefully, one day, the women can have the same opportunities in this country. In a 1989 article entitled "After College, American Stars Play Overseas—or Not at All" the situation is described:

> The similarities between Michael Jordan and Cheryl Miller are striking. They both were consensus All-Americans who led their teams to National Collegiate Athletic Association titles as sophomores and were named James Naismith Award winners as juniors. And both won gold medals in the 1984 Los Angeles Olympics.
>
> But here is where the similarity ends. Jordan was able to parlay his collegiate success into a career in the National Basketball Association. For Miller, however, playing professional basketball in the United States was no more than a dream. (White, 1989, p. 1)

The rules for women's basketball have remained fairly constant in recent years. The caliber of play has increased tremendously and to accelerate this improvement two significant rule changes have occurred. In 1984, a smaller ball was adopted which is about one inch less in circumference and two ounces lighter than the former ball and the one presently used by men. The Women's Basketball Rules Committee, when announcing the adoption of the new ball, stated their reasons for the change:

> ...(will) make the game more fun for the players. It will decrease turnovers, increase the shooting range, make passes crisper, and make the game faster. The second reason, of course, is spectator appeal. You'll be looking at a faster game. Skills are truly increased by using it. (*The Chronicle of Higher Education*, 1984, p. 24)

The three point shot was adopted in 1987 and has had profound effect on the game. It has "added excitement to the game and provided teams an opportunity to come from behind" (*Women's Rules Committee Report*, 1988, p. 10).

In conclusion, few sports in history have had as colorful a development as women's basketball. The most interesting aspect of the game's growth has been the change in attitude from one extreme to another. When intercollegiate contests became prevalent, controversy and negative publicity forced their elimination and reduced most competition to play days. Over the years the situation has certainly changed and is best reflected by these developments:

1. In the early three court game contests were often closed to spectators and even if allowed, the numbers were not usually significant. NCAA figures show that an average of 2000 persons attended women's basketball games in 1982 whereas in 1989-1990 four million spectators viewed women's intercollegiate basketball games. Furthermore, 40,000 attended the 1990 Final Four of the NCAA National Women's Championships (Lilley, 1990, p. 2).
2. In 1984, the first time the NCAA awarded a payout for a team that qualified for the National Tournament, the amount was $174 for each team. In 1990 the same payout was approximately $18,000 (Campbell, 1991, pp. 6, 17).
3. The 1991 Final Four for the NCAA Women's Championships had a record 300 media as well as live television coverage of all four games (McConnell, 1991, p. 8).
4. To celebrate the 100th anniversary of the invention of basketball, NAGWS published in 1991 an impressive, comprehensive book entitled *A Century of Women's Basketball*. The detailed chapters, written by many authorities on women's sports, describe the dramatic changes in and surrounding the game of basketball for girls and women from the beginning to the present.

So, from a slow paced sport on a floor divided into three parts to the fast running full court game of today, women's basketball has certainly experienced incredible changes. Without doubt, it will continue to grow and prosper as the coaches become more skillful and strategic and thus produce more talented players. There may be some rule changes in the future but it is speculated the impact will never be as significant as the first 100 years of women's basketball.

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The Female Coach: The Pressure Is On

Connie M. Thorngren

The female basketball coach: dedicated, motivated, progressive, and as indicated by recent research, a member of a declining population (Acosta & Carpenter, 1988). All of these terms describe the modern woman in the profession. It appears that women who choose to coach basketball are goal oriented, assertive, and decisive. They are able to make tough decisions on and off the court. By the time they get into the coaching ranks, many have already faced difficult choices affecting their personal and professional lives and futures.

Coaching is a pressure filled occupation which demands a competitive spirit and desire for challenge. While it is recognized that coaching is a stress producing profession for both sexes, there appear to be some gender differences. Many women are placed in stressful situations that differ from those faced by male coaches, especially in their personal lives. What are some of the stressors which must be dealt with by female coaches other than those inherent in the profession? How does this pressure affect women? What can be done to make coaching more enjoyable and rewarding for a greater number of women? These are the questions discussed in this article.

In searching for answers to these questions, this author interviewed over 50 female coaches, athletic directors, researchers, and leaders concerning their perceptions of stress factors affecting female coaches. The study involved individuals at various professional levels in 15 states representing all areas of the country. Additional research involved a questionnaire returned by 348 coaches from across the United States (Thorngren & Fahleson, 1990).

In general, those interviewed believed that the loss of women in coaching positions is a significant problem, that female role models for all athletes are desirable, and that concentrated effort is needed to encourage qualified

women to pursue and remain in coaching careers. Defining and interpreting stressors that particularly affect female coaches is an important basis for devising strategies to increase retention levels. The following areas were considered critical in that process.

Philosophical Differences

Many women interviewed believed that there is one basic difference between men's and women's coaching philosophies. Women coaches perceived themselves to be more "player-oriented" than "win-oriented," but believed male coaches were more "win-oriented." These philosophical differences have the potential for creating stress because female coaches are usually evaluated by administrators and fans more familiar with the male perspective of sport and coaching. Female coaches may feel pressure to become more "product" or win-oriented than "process" or player-oriented, forcing them to act in opposition to what some labeled as an educationally based philosophy. As basketball has high revenue potential in most schools, financial considerations are likely to augment the posture of placing highest concern with "product."

However, even as women are accepting and working within this masculine sport framework, there is simultaneous pressure to maintain a feminine image in coaching roles and conduct. A number of women struggle with this "Catch 22" situation, while for others it is just part of learning to "play the game." Although it is difficult to measure the effect of this internal conflict on coaching retention, some women believed it to be one source of stress.

Devaluation

Coaches and female administrators viewed themselves as being highly motivated, and they often stated that their own expectations created the most stress. However, many were disappointed with the lack of respect for the women's program, although they usually added that the situation is improving. Coaches found it discouraging to put the same amount of time and effort into their teams as did the coaches of men's basketball and still have their programs considered less important in terms of salary and acknowledgment. One high school female administrator noted, "There is a lot of pressure in always being considered second class and trying to change that status."

Many women had intrinsic and extrinsic pressure to increase spectator attendance at games and to "pay their own way." They willingly accepted increasing revenues as an objective, but usually did not feel they received

sufficient support to accomplish the goal. Many women believed they and their assistants were expected to fill more roles than was required of coaches in the male program. These roles often included publicity and promotion, game organization, secretarial duties, and equipment set-up. These tasks further defined their program as second class and increased the work load.

Most female coaches viewed their primary reward as internal satisfaction, often described as appreciation from athletes or a feeling of providing an important service. They believed male coaches received greater external rewards, such as respect and/or attention from the community and administration as well as greater monetary compensation (Thorngren & Fahleson, 1990).

It is probable that if women do not feel appreciated by athletes, their motivation for staying in coaching is greatly diminished. Some commented that today's athletes are less dedicated than previous athletes. In reality, this was probably more closely related to changing attitudes and expectations of students than to dedication (see Blinde [1989] for further discussion), but it somehow created a sense of devaluation for the coach. This change in student attitude as well as insufficient salaries were considered common reasons for dropping out of coaching.

Isolation

The decrease in the number of women in coaching has produced an increased isolation for many coaches. Many individuals reported they were the only female coach in their school or area. Some had difficulty moving to or staying in a small community because of the perceived isolation. One woman said she decided to leave coaching when she became the lone female in her league. While this status may be acceptable or even preferable to some, most women lamented the lack of colleagues with whom to share common problems and ideas.

Another result of isolation is tokenism which leads to limited power in athletic decision making. Female coaches have often chosen, and been encouraged, to "stand alone." Their isolation may keep them from expressing dissatisfaction as they do not want to be considered complainers.

The support network for female coaches was invariably criticized by those in the field. Several women commented that if a female loses a coaching job, it is difficult for her to find a similar position, whereas males in these situations are often quickly hired in another school district. They believed this disparity is the result of a weak network between women, and between women and

administrators. There was also the perception that females are judged more critically than are males. Females who are fired are more likely to be considered personally responsible due to their own wrong actions or incompetencies, whereas males are more often considered to have lost jobs because of incompatible situations.

These attitudes place a great deal of pressure on women to be perfect in their first coaching experience. Many did not perceive themselves as being allowed to make mistakes. Several coaches commented, "If you are not good, you should get out." Although this statement may be acceptable idealistically, it does little to allow for or encourage growth, and ultimately eliminates more women than men.

Gender Bias

High potential for stress exists among female basketball coaches because basketball is a priority sport played by both sexes. Consequently, comparisons between all coaches and their programs are often and easily made. Women may be viewed as having less experience and skill than males even when there exists contrary statistical evidence. For example, women's basketball coaches often hear comments such as, "The women's game is not as exciting to watch as the men's game," or "The women do not shoot as well as the men." Based upon National Collegiate Athletic Association statistics for men's and women's basketball there is little difference in shooting percentage in field goals, free throws, or 3 point shots (*NCAA News*, 1990), but the perception of a difference exists. The perceptions others have concerning female coaches may be biased in the same way. This bias can affect performance evaluations and hiring.

Another stressor denied by many coaches but frequently mentioned by athletic directors and supported by research (Parkhouse & Williams, 1986) was the preference of some female players for male coaches. This attitude was usually attributed to the increasing number of male role models. Even very successful female coaches had encountered prospective athletes who indicated that they preferred a male coach. Some coaches approached this attitude as a minor problem quickly eliminated by good coaching. However, athletic directors viewed it as additional pressure on the female coach to be perfect.

A sport psychologist implied that females must prove themselves capable with every new group of athletes before they can begin the business of coaching, whereas males are considered capable until proven otherwise. This

difference may appear to be a subtle one, but it creates an additional energy drain that affects productivity at a key point in the sport season.

Marriage and Family

The married female coach faces the same problems as other married career women except that her working day may be longer. Games and travel on weekends further curtail personal time. Married women interviewed believed their marriages were nontraditional since husbands shared household chores and responsibilities. They did not view their situation as the norm for all women and believed many drop out of coaching because of marriage and children. Women valued the support and balance in their lives provided by a spouse or family. They also believed they had expended great effort in maintaining a successful marriage.

Female coaches with children face extreme pressure. The mother of two teenage children, who had coached NCAA Division I basketball as her children were growing up, said she could not envision repeating this experience. The pressure was simply too great. She also believed the degree of intensity in coaching had risen in recent years, a factor that could make the profession increasingly difficult for women with children.

This coach was also one of several who mentioned that pressure often comes from co-workers (including other women) who ask well-intended questions like, "How do you manage to do it all and still take care of your children?" or "Don't you feel guilty about spending so much time away from your kids?"

Caccese and Meyerberg (1984) indicated that most male Division I college coaches were married, whereas most female coaches were single. Marriage may enhance a male's coaching opportunities if his mate provides stress relief in terms of social support, child care, and home management. The married female coach does not usually have this advantage as she is expected by society to fulfill traditional roles including providing primary care for her children.

The Single Coach

A majority of the coaches taking part in this study were single. These coaches believed that it was easier for them than for married women to make the time commitments required for successful coaching. However, they lamented the lack of help with home care and nonschool related responsibilities that was

perceived to be available to married males and, in some respects, to married females. Several single coaches believed they were given the least preferable practice times in order to allow married coaches to be home earlier with their family. Some of the dissatisfaction in this area came simply from not being asked about their feelings and the assumption that they had no interests or responsibilities other than coaching.

Because of late practices, games, or travel on weekends, many coaches stated that maintaining any kind of personal life was difficult. Starting new relationships was especially taxing. However, for most women, there was subtle pressure to project an active heterosexual image. Some women reported instances of administrators investigating the sexual preference of female coaches during the hiring process.

Forty-two percent of coaches responding to a questionnaire (Thorngren & Fahleson, 1990) stated that homophobia had affected the hiring, firing, or demotion of some female coaches that they knew or with whom they worked. Fifty percent believed homophobia sometimes affects collegiate recruiting through such occurrences as "blackballing" of various institutions by well meaning but ill-informed people advising prospective college athletes. Also, it is easy for a college coach to cast a negative image on an opponent's program. Many female administrators and several coaches believed that males were sometimes hired as head coaches or assistants in reaction to homophobic attitudes.

Some women stated that prejudice concerning sexual orientation limits their social life especially with female friends. One athletic director believed many young single coaches are increasingly isolated as they choose not to share an apartment with another female in order to avoid being stereotyped. Such actions result in the elimination of a possible emotional support system, as well as economic support since the coach must bear all household expenses.

Recommendations

Coaching is a high pressure job in what is generally considered a masculine domain and women have traditionally borne most of the labor of child care and domestic tasks. For these and other reasons, it will take effort and commitment by both men and women to keep women in coaching positions.

Many women want to coach. All of the women interviewed in this study believed that coaching is very stressful, but most of them also believed it is worth the effort. Even those who are no longer coaching were generally

pleased to have had the opportunity, and most are actively encouraging young women to enter the field.

There are some strategies that can be used immediately to make coaching more rewarding for women. Administrators must realize how important positive support is for female coaches. They must listen to their concerns, take those concerns seriously, and be an ally in ensuring that women are treated equitably. In addition, the administrator who attends the girls' and women's sporting events as often as the boys' and men's events, will send a strong message to the female coach that her efforts are valued.

Administrators must be willing to confront and understand their own gender bias and homophobia. They must become proactive in preventing such bias from occurring in their schools in the same way that they work to prevent racial and cultural bias.

Female coaches must build a stronger network by maintaining and creating ties with other women. Hiring female assistants and encouraging talented students to become coaches is a vital and empowering part of establishing that network.

The next step in the networking process is to be supportive of other women in the field. Women have felt the need to be perfect in order to succeed as coaches. Consequently, they may expect that perfection of others. There must be an acceptance of varied experiences and abilities in female coaches just as there is for males. In addition to giving support to those we believe are highly competent, we need to provide assistance to those who are struggling. This tolerant attitude is mandated by the fact that the number of women in coaching is continuing to decline while the number of men coaching women continues to increase. This trend continues to be true even though women are as professionally qualified to coach as are men (Hasbrook, Hart, Mathes, & True, 1987; Sisley & Capel, 1986).

There is great need for an increased number of female coaches. Women are important as role models for both boys and girls and for the unique experience and insight they bring to sport. Recognition of the special stressors that affect female coaches can lead to dialogue that will produce strategies to increase their numbers. We must find ways to make the female coaching experience even more fulfilling.

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Aggressive Behavior: Part of the Game or Part of the Problem

M. Kathleen Ryan

With less than two minutes left in a crucial playoff game, your team is behind by three points. Sally, your star forward, averaging 18.9 points a game, has been held to seven points by the physically rough defense of the opposing team's best player. Tension in the gymnasium escalates as Sally receives a pass and readies for a baseline drive to the basket. As Sally begins the drive, the player guarding her takes a set position in the intended path of the drive. Realizing that she has no time to avoid a collision, Sally decides to use the opportunity to her team's "advantage" by sharply elbowing her opponent in the stomach, knocking the wind out of her and, thereby, renders the opponent unable to finish the game. With the opposing team's most talented player eliminated from the game, you realize the increased likelihood of your team gaining a victory. Do you remove Sally from the game or do you condone her behavior by allowing her to continue?

With this paper, some of the pertinent issues surrounding aggressiveness in basketball will be identified and some prescriptions will be offered that coaches can implement to help prevent their players from initiating hostile actions.

Basketball is undergoing a transformation from a noncontact sport of finesse and quickness to a contact sport of size and power. The transition from a noncontact to a contact sport has been matched by a concomitant increase in rough play and aggressive actions. In fact, it has been found that girls participating in medium contact sports (basketball and soccer) had higher physical and nonphysical aggressive tendencies in both sport and daily life contexts than girls participating in noncontact sports (Bredemeier, Weiss,

Shields, & Cooper, 1986). Bredemeier et al. explained that since sports allowing physical contact encourage rough behavior, it is not surprising that participation in these sports is associated with aggressiveness in sports. The authors further noted that since aggression in athletics was also related to aggression in everyday life, the sport experiences may be related to behavioral characteristics of the participants that extend beyond the athletic domain. Although patterns of causality among the variables are not determined, we can conclude that aggressive behavior by girls and women is a prominent issue in medium contact sports such as basketball.

Layman (1968) defined the term aggression as the initiation of an attack and delineated two major types of aggressive behavior. Reactive aggression is an action directed at the target for the means of injury itself. The target is perceived as an agent of frustration or the source of noxious stimuli. A basketball player taking a swing at an opponent for having roughly screened her is an example of reactive aggression. In contrast, instrumental aggression was defined as behavior directed at the target for a means other than the injury itself. For example, upon grabbing a rebound, a player elbows an opponent attempting to steal the ball. The primary goal of the action is to retain possession of the ball and the injury is a means of pursuing that goal. Although many situations may elicit these types of behaviors in basketball, instrumental aggression is most often utilized as a means to pursue victory, while hostile (reactive) aggression appears to be implemented primarily as a means of retaliation when frustration and anger are experienced.

The Problem

Frustration occurs when the means for attaining one's goals or objectives are hindered. The primary goal in basketball is to win the game. The means intended for winning the game are to put the ball through the hoop a greater number of times than the opponent does. A player may experience frustration when this objective is thwarted. Typically, the frustration is especially heightened in games very close in score, games against a team rival, playoff games, and when one's team is not performing well. In addition to these situational factors we would expect individual characteristics of the players to also play a role in aggressive behavior.

Personal factors that could possibly heighten an individual's sense of frustration may include seeing less playing time than one would like, Type A behavioral patterns, and excessively high expectations from demanding parents and coaches. Frustration is also likely to escalate among players

expressing a win-at-all-cost attitude in that these players recognize no goal other than victory. We might expect such players to utilize instrumental aggression in the pursuit of victory more frequently than players who recognize the "well-played game" as a worthy end. Since product-oriented players are likely to experience greater frustration in the face of defeat, they also would be expected to resort to reactive aggression (retaliation) more frequently than a player who perceives the game as more than a mere opportunity for victory or defeat.

With a recent study aimed at trying to discern the factors influencing aggressive actions in sport Ryan, Williams, and Wimer (1990) identified retaliation as the situation most likely to elicit aggression. With revenge being such a potent elicitor of aggression, it may be in our players' best interest to attempt to prevent this retaliation. Most coaches have observed situations in which retaliation was not impeded and the resulting escalation of violence continued until the situation was clearly dangerous. Unfortunately, many players believe that prevention of hostilities and control of the game lie with the officials. This author suggests that an unavoidable responsibility to play a clean game lies exclusively with the players themselves.

The Prescription

Perhaps we as coaches can help provide our athletes with tools for preventing and controlling potentially volatile situations in ways that maintain the integrity of both the individual participants and the game of basketball. Clearly, this goal is more difficult if the referee is not aware of an incident. Furthermore, charging the offending player with a foul is often enough satisfaction for the player who was fouled. But in instances where the referee is not calling the game "tightly" or is missing calls, the situation becomes increasingly precarious. While there is little that a coach can do during a game except take the player out to let her cool down and offer her some reassurance, prescription for preventing hostilities can and should be addressed prior to competition.

Of primary importance in preventing aggressive outbreaks on the court is establishing the opponent as a person to be respected rather than an object to be defeated. Layman (1968) described the tendency for persons to be more aggressive toward an outgroup than toward an ingroup. Thus, if it can be acknowledged that teams are contesting *together* rather than exclusively *against* each other, perhaps hostile outbreaks would subside. The furtherance of this goal may be facilitated by developing a friendly rapport with

opponents. Although prior to a game there is little opportunity to acquaint oneself with an opponent, a simple handshake, a "How's it going?" or a smile can help affirm a contest of people rather than a battlefield of opponents. Coaches can encourage positive interaction and act as role models by establishing similar relationships with the coach of the other team.

It is generally assumed that a coach can have a positive impact on his or her athletes. Barnes (1990) has suggested that this may result from role modeling appropriate behavior and being empathetic to the needs of athletes by never viewing them as a means to an end. We may surmise that by exemplifying such behavior, the athletes will in turn learn that opponents are not simply means to winning the game.

It has also been shown by Bredemeier, Weiss, Shields, and Shewchuck (1986) that the implementation of a social learning theory program by adult group leaders can facilitate the moral development of young sport participants. We have every reason to believe that implementation of strategies designed to portray the belief that aggressive behavior is not appropriate will influence some participants to follow a code of behavior reflective of such beliefs. These strategies need not be complex or overburdening, but may be quite simple.

For example, upon witnessing an intentionally injurious action between scrimmage opponents, the coach may express to the team how disappointing these actions are and raise the following issues related to such behavior:

Aggressive actions are not intended to be a part of the basketball contest, and if such actions are employed, participants actually cease to contest. Fraleigh (1982) has extensively addressed this issue in considering the "good foul" and writes:

> If one opponent fails to pursue the "pre-lusory" goal of the sport by not performing the required and permitted skills and tactics and/or does perform the prohibited skills and tactics, then all participants cannot be facing the same test and, thus, the participants cannot be contesting. (p. 41)

The game is no longer basketball when the players incorporate prohibited actions.

The possibility of incurring an injury escalates when increased roughness and "cheap shots" occur. Physical or psychological injuries resulting from aggressive attacks are potential game transcending occurrences unrecognized by the implicit agreement of basketball participants. Certain stipula-

tions are implicitly agreed upon when entering the athletic contest (Bredemeier & Shields, 1986a), including the agreement that game actions and artificial inequalities will be limited to the spatial and temporal boundaries of the sporting contest. Concerning the legitimacy of aggressive actions within the sport contest, Bredemeier and Shields (1986b) wrote of two basic criteria that they believe all developmentally mature individuals would acknowledge.

> First, any act intended to inflict an injury that reasonably could be predicted to be "game-transcending" is illegitimate.... Second, any intentionally injurious act is illegitimate if it occurs apart from the strategic employment of game-constitutive skills, even if such an act is intended to cause only minor injury or mild discomfort. (p. 23)

According to Bredemeier and Shields, though the legitimacy of "stretching the rules" is questionable, actions of reactive aggression, where injury itself is the primary goal, and actions clearly contraindicated by the rule structure should be considered illegitimate.

Instrumental use of aggression (violent cheating) sacrifices personal integrity, suggesting that the individual's basketball skills are inadequate means for successful execution in the game. If players' skills were sufficient to accomplish the task, there would be no reason to cheat. In essence, cheating in the form of aggressive actions is acknowledgment that one's skills are inadequate.

Another possible coaching method is to put the aggressor in the place of the aggressee. Ask the player how she would like to be on the receiving side of the aggressive action. The "Golden Rule" does have a place on the basketball court.

Take pride in composure. Any person can lash out when frustrated or hit someone back for being hit. It takes a strong person to keep composed under pressure. An athlete ought to take pride in being the player with the greatest demeanor on the court and for representing an exemplary standard for the rest of the team.

The Discussion

Barnes proposed utilization of a cooperative style of coaching to mitigate aggressive behavior in athletes. By keeping the lines of communication open and active, we expect that critical issues will be given a proper arena in which

to be addressed. The coach can then help generate discourse concerning appropriate behaviors on the basketball court by facilitating open discussion geared toward the following questions:

1. What are the rules of basketball concerning physical contact and verbal exchange among players?
2. What is the purpose of the rules as they are stated?
3. Is it right to "stretch the rules" in ways that may be disparate from the actual intent of the rules.
4. What are the appropriate means of pursuing the goals of the game?
5. How does personal responsibility for commission of aggressive acts impact one's decisions on the basketball court?
6. What are the moral obligations taken onto the basketball court?

The final question is a serious issue that far too many coaches avoid discussing with their teams. Although sport is frequently accepted as more egocentric than everyday life, there must be boundaries to the pursuit of self-directed goals and behaviors to the exclusion of relying upon externalized sanctions regulated by the officials. These goals and boundaries must be explicitly defined so that our players accept their personal responsibility for adhering to a code of ethics that recognizes the individual rights of the other competitors.

If our protagonist in the opening story had recognized the responsibilities implicit in her agreement to play basketball, her actions might have been quite different from those described. Athletes must recognize and accept the moral obligation created by the opponent's rights as a person and guide one's behavior accordingly. The responsibility for the character and control of the game lies with the players. It is the task of the coaches to ensure that players grasp this responsibility.

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Fit the Game to the Player

Carolyn Lehr

The goal of teachers and coaches at all grade levels is to teach correct basketball skill techniques. When a student or player is performing a skill ineffectively or inefficiently the teacher utilizes various methods or strategies to correct the error. The result in many cases is an improved movement pattern, but there are still instances in which the performer is executing a flat shot or an illegal dribble. When this occurs the fault is usually placed on the teacher, or perhaps the physical maturity of the student. What might be a more accurate cause for ineffective and inefficient movement patterns is attempting to execute skills with mismatched equipment or rules. If equipment is used which fits or matches the player, correct techniques can be fostered. If equipment does not fit the player, problems in technique result.

There does not seem to be a rational reason why the size of basketballs, court size, and goal height should be standard for all players. Modifications of these conditions could be made to parallel the player's development and ultimately contribute to the successful execution of basketball skills.

Basketballs

The size of the basketball is a very important variable in the development of basketball skills. Realization of that fact is demonstrated by the difference in circumference in regulation men's and women's basketballs, 30" and 28½" respectively. Unfortunately, these basketballs, if not exclusively the men's size, are used for all age groups regardless of the size of the player.

Virtually every author of basketball books describes the correct hand position on the ball for shooting, passing, and dribbling techniques. These

writers clearly indicate the correct position of the fingers, and emphasize the elimination of the palm on the ball when executing these skills. What is not presented is that the ball size may dictate how the fingers and hand are positioned on the ball. Additionally, error correction charts are used to identify the position of the hand and fingers on the ball as a factor for lack of proper spin, but rarely is the size of the ball listed as a factor of inefficient shooting.

Prior to grades 7–9 boys and girls can use the same size basketball, but the ball should be smaller than regulation and may vary according to age and development of hand size. There may be variation in hand sizes within a specific grade level, but there will be a greater difference in hand size between the third grader and the seventh grader. Manufacturers of basketballs have realized these differences and recommended the use of the mini, junior, and intermediate size basketball for various age groups.

Specifically, one supplier makes the following recommendations:

Preschool	8 oz. ball	22" circumference
Grades 1–2	10 oz. ball	24" circumference
Grades 3–4	14 oz. ball	26" circumference
Grades 5–8	18 oz. ball	28½" circumference
Grades 8–12	22 oz. ball	30" circumference

In most cases the teaching setting is determined by specific age categories, but grade level alone should not dictate the daily lesson plan. What should be considered is grouping students for drills and game situations by height and hand size, in addition to skill level. Different size basketballs can then be used to accommodate the specific groupings. Groupings may also be designated by student choice; students select the ball that fits their liking, thus groups are formed automatically.

Goal Height

Why is the height of the official basketball rim set at ten feet? The explanation is simple. Ten feet was the height of the balcony where the peach basket was hung in 1891.

Basketball skills may suffer as a result of the ten foot height of the rim. Even with proportional-sized basketballs, the participant may use improper techniques to achieve the "goal." The "throw" or "shot put" technique is often used

by short players to produce the force needed to attain the distance between the player and the rim. Thus, a goal height which matches the participant would foster proper shooting techniques.

Goals that adjust from 6 feet to 10 feet are readily available. There are models designed as either wall or pole mount, and height adjustments are made with a hand crank. This type of equipment can be used when different grade levels share a facility, or when regulation goals are required. Thus, different age groups and skill abilities can be accommodated in the same facility.

Court Dimensions

The minimum and maximum dimensions of the regulation basketball court are designated in the rules. Similarly the size of the free throw lane and the distance from the basket to the foul line are identified. Research investigations and practical sense "tell us" that there is a very close relationship between a person's height and the running stride. It takes a shorter person more steps to cover a specific distance than a taller person. It would be simple to decrease any of these areas with the use of plastic floor marking tape. Various colors could also be used to indicate the free throw line and lane lines to accommodate various groupings. These modifications can result in greater participation and reinforcement of proper skill techniques.

Two examples of how a regulation basketball court could be modified are depicted in Figures 1 and 2.

Figure 1. *Example of a modified regulation basketball court.*

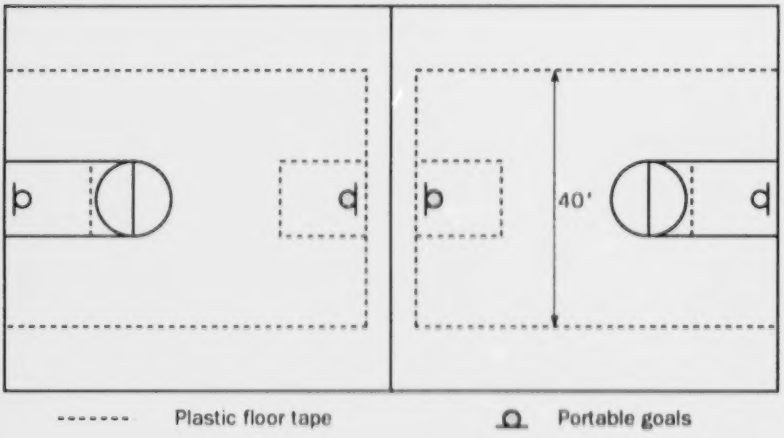
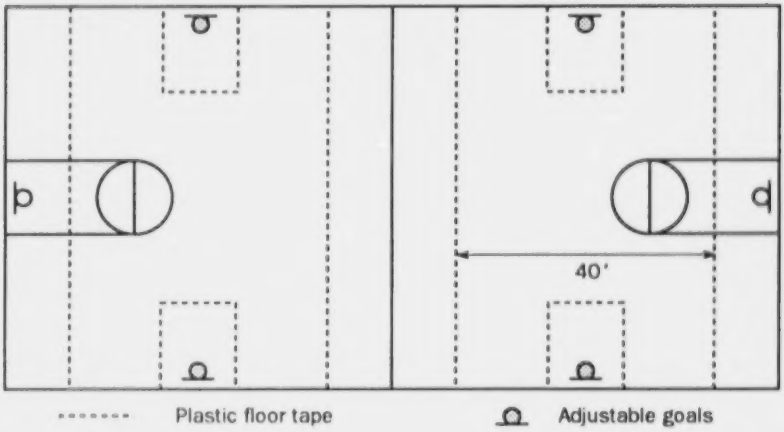


Figure 2. *Height setting can be different for each court.*



Does the Game Fit the Player?

Modifications in the game of basketball should be made to accommodate both the three foot player and the five foot player, the small handed players and the less muscular players. The modifications can be in the form of the size of the basketball, the height of the goal, and court dimensions. These alterations or adjustments will enhance proper biomechanical techniques at an early age and reinforce new techniques when the person matures. A high level of skill by a larger number of players will result. Moreover, a greater number of adults can enjoy the game of basketball in a recreational setting if the facility and equipment fit the players' anatomy.

Teamwork

M. Karen Ruder

An important component of successful team performance is teamwork. In basketball, teamwork may be considered as the coordination of the effort and ability of the five players on the court to achieve team success. However, teamwork is actually a process which involves the leadership of the coach, the dynamics of the team, and the influence of situational characteristics (Chelladurai, 1984).

Leadership

The characteristics of the coach and coaching behaviors are key elements in leadership. Two significant styles of leadership in coaches have been identified: the autocratic style and the democratic style. The coach who is task-centered, asserts authority, and makes decisions independently is considered to be autocratic. The democratic coach is athlete-centered and involves the team in the decision-making process. However, the effective coach utilizes a combination of both styles to meet the needs of the situation (Chelladurai, 1986). For instance, the team captain may be chosen by the team, but the coach decides independently to bench the star point guard for breaking a team rule.

Researchers have demonstrated that more experienced players indicate a greater preference for autocratic coaches who emphasize training and instructions while adolescents prefer athlete-oriented coaches who give social support (Chelladurai & Carron, 1983). Women basketball players are more satisfied with coaches who give social support and who are democratic and allow participation in the decision-making process (Weiss & Freidrichs, 1986).

However, the leadership style of the coach is only one aspect of leadership. Strong leadership also develops from positive coaching behaviors that are

relevant to the situation. Coaches must be knowledgeable about the sport, provide social support within the teams, set an example by being a positive role model, provide each athlete with the opportunity for success, reinforce and reward individual and team efforts, and avoid remarks that are sexist, racist, or dehumanizing (Murray, 1986).

Leadership within the team is also important. Natural leaders will emerge with the development of the team. Coaches can encourage team leaders by delegating responsibilities and encouraging leadership behaviors (Murray, 1986). Formal leaders such as team captains can be used to facilitate communication between the coach and the players and to keep the coach informed on problems developing within the team. Informal leaders may also emerge through their roles within the team. For instance, the point guard position requires a hard worker with leadership qualities.

Communication

Communication skills are both verbal and nonverbal and involve being a listener as well as a speaker. Much of the communication given by coaches is feedback, used to improve and reinforce performance. Feedback directed toward effort, as opposed to outcome, will improve intrinsic motivation and feelings of personal competency. For maximum effectiveness, praise should follow the behavior as soon as possible but praise at a later time is better than none at all. Praise that reinforces cooperation among players will enhance interplayer relationships (Bird & Cripe, 1986).

Criticism is an effective form of feedback when used sparingly and carefully for instructions or discipline (Smith, 1986). Criticism should be directed toward the task, not the individual. When making a correction, John Wooden, former UCLA National Champion basketball coach, advocated utilizing criticism followed immediately by instructions on how to perform the action correctly (Tharp & Gallimore, 1976).

Since skills should be perfected before the player is asked to use them in a competitive situation, communication in game situations should be directed only toward improving strategy. To direct attention to technique will only confuse the player and reduce awareness of important cues in the environment. Sometimes, making changes in strategies and sequences just before competition results in broken concentration and haphazard final preparations (Frieschlag, 1985).

Athletes and coaches differ on the importance of verbal and nonverbal communication. Coaches believe that verbal is better and more helpful, whereas

athletes think coaches talk too much and are redundant. Players will listen more during a competition when coaches say only what is important. Constant chatter by the coach during games tends to be tuned out by the players.

A player who needs to be reprimanded should be taken off to the side. When reprimanded in front of teammates and fans, athletes are put on the defensive and resultant behavior is unpredictable. Players who are "pulled out" of the game should be told the reason, not ignored. Each athlete must be treated fairly and consistently. No advantage should be shown to a star player. When players are treated differently, the result will be rivalry as opposed to team spirit (Zander, 1975).

Interpersonal communication occurs one-to-one between the coach and player. Feedback should be directed toward encouragement and support of the individual as opposed to criticism and humiliation. When corrections are made, negative or accusing statements directed toward the athlete need to be avoided. Criticism of the undesirable behavior is constructive and less threatening (Frieschlag, 1985).

Players need to communicate with each other as well as with the coach. Feelings about workouts, views on individual roles, and attitudes toward other team members should be discussed. Players must learn to communicate to teammates and coaches what kinds of behaviors they appreciate and what kinds are unacceptable. Gossip and backbiting are destructive and need to be discouraged. Teammates should be encouraged to be positive toward each other in practices and games.

Communication lines between the head coach and her coaching staff need to be open and continuous. The head coach needs to provide encouragement toward her staff and work for cooperation toward common goals. Duties of staff members should be clarified in writing and meetings held regularly to promote communication. Contributions by the coaching staff should be recognized and rewarded.

Team Structure

When selecting the squad, coaches must consider the needs of the sport. Basketball requires speed, agility, upper body strength, cardiorespiratory efficiency, and height. One overly strong individual or weak player reduces coordination on both offense and defense resulting in lowered team productivity. The squad size must be large enough to perform the activity but small enough so that each member receives individual attention. In basketball, the recommended squad size is 10-12 (Carron, 1986).

Consideration also needs to be given to psychological factors. As basketball is a team sport, compatibility and cooperation among players are important. Satisfaction with team membership occurs when each player supports the team's goals, feels that she is making a contribution whatever her role, and identifies with the group (Yukelson, Weinberg & Jackson, 1984). As the squad develops as a team, differences in status among players emerge. Returning players, starters, and team leaders have higher status than do novices and bench players. However, through appropriate attention to all players, each can become a valued and contributing member of the team. New and veteran players should work together in warmups and drills. The contributions of all players must be recognized and appreciated, both privately and publicly. Identification of each individual as a member of the team can be achieved through team emblems (such as jackets), social events, and traditions (Carron, 1986).

Motivation

Team motivation is enhanced when each individual realizes how she can contribute to the team. Each individual must be committed to the group in both sharing in success and taking responsibility for failure. The team must go through a constant process of evaluation in order to improve. Therefore, goals must be formulated both for the team and the individual.

The degree of agreement on team goals is a factor in the commitment of the individual to the team, as well as in personal motivation and satisfaction. In a team sport such as basketball, team goals must have a higher priority than individual goals. An individual will be committed to a goal that she helped formulate. Therefore, team goals should be developed by the players and the coach together and should be evaluated periodically during the season. After each contest, the coach should meet with the team for a verbal evaluation of performance in terms of achievement of team goals. Discussion should emphasize which goals were met, as well as which were not. Specific plans for achieving the goals in the next competition should then be presented.

Individual goals provide the opportunity for success by each player. Individual goals can be developed in meetings between the coach and the player, or by the athlete alone.

Knowledge of results is necessary for goals to be effective. Therefore, both team and individual goals should be measurable as well as challenging. Also, goals should emphasize effort for pride and satisfaction in performance and achievement (Zander, 1975).

Environment

Athletes feel secure when surrounded by predictable situations such as regular practice times and organized personnel. Security is also enhanced when each player is technically prepared to enter a contest before doing so. A player who has had concentrated instruction in a technique or strategy will respond automatically to the cues in the environment. An inexperienced player may not (Fuoss & Troppmann, 1981). Therefore, practice sessions need to be designed for the unexpected situational factors of competition. Although most coaches effectively prepare athletes in terms of skills, techniques, and strategies, many overlook simulating the competitive experience in a dress rehearsal involving uniforms, officials, equipment and facilities, and spectators (Schmid & Peper, 1986).

Players need to practice in the uniform that will be worn in competition. The same brand of basketball that will be used in the game should be used in practice. If the game is at home, practice should take place on the game court in order to have a home court advantage. If the game is away, practice should be held using backboards and a floor surface similar to the opponents'. When possible, practice should be scheduled for the same time of day as the contest so that conditions such as fatigue, hunger, and lighting are similar. Officials should be utilized during practice to enforce all fouls and penalties. All nonplaying athletes should be required to be on the bench and the coach required to remain in the coaching area. The clock should be running and the buzzer should be used for substitutions, as well as for the start and end of the playing periods.

The presence of spectators can both help and hurt performance. Early season practices should be closed as the presence of an audience during learning of skills and strategies increases anxiety resulting in decreased performance. However, as skills become well-learned, practices should be opened to spectators. Not only will athletes learn to perform in front of others but motivation will also increase. Practices should be structured to prepare for hostile spectators. For instance, a tape recording of hostile crowd noises can be played during a scrimmage (Carron, 1984).

Summary

Basketball is a team sport which depends on the coach creating an atmosphere in which the effectiveness of each individual on the team, as well as the team as a whole, can be maximized. The success of any coach is dependent

upon accomplishing goals through the efforts of others, namely the team. The effective basketball coach provides leadership that is authoritative yet supportive, establishes open lines of communication between the staff and the players, structures the team to maximize each individual's potential contribution, and motivates the team and players through realistic and challenging goal setting. The end result of these efforts will be an efficient and effective basketball team whose objectives of both team success and individual satisfaction can be accomplished.

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Nutrition and Its Application to Basketball

Mildred Barnes

Training techniques for various sports have received considerable attention over the years. Not until relatively recently has similar attention been devoted to the value of nutrition for enhancing performance. It is clear that knowledge of nutrition and exercise physiology is at a level where specific recommendations can be made about the food basketball players eat. It is also clear that many dedicated athletes pursue nutritional practices which are ineffective and contraindicated. These practices may be related partially to the acknowledged lack of nutritive background expressed by 61% of coaches (Paar et al., 1984). Although training is the single most important factor in improving basketball performance, the value of proper nutritional practices cannot be overlooked.

Why We Eat

Food satisfies three basic needs in the body: energy, repair and growth of tissues, and chemical regulation of metabolic functions. Food provides essential nutrients which are required, but cannot be synthesized in the body in the quantities needed. There are six basic nutrients: carbohydrates, fats, proteins, vitamins, minerals, and water. Neither vitamins nor minerals can be metabolized to provide energy, but energy cannot be released from carbohydrates, fats, or proteins without the vitamin and mineral support required in the metabolic process for release of energy. Thus, nutrients are interdependent and the deficiency of any one will have an effect on the total well-being of the individual.

By eating on a daily basis a variety of foods from the basic four food groups, one can obtain a well balanced diet that includes all nutrients. The basic four

food groups include: (1) milk and milk products (milk, cheese, ice cream, yogurt); (2) high protein foods (meat, poultry, fish, eggs, dried peas, beans, nuts, seeds); (3) fruits and vegetables (fresh, canned, frozen); and (4) bread and cereals (whole grain or enriched, pasta). The recommended servings for each group are: 2 cups of milk; two 3 oz servings of protein; 4 servings of fruits and vegetables (including one green or yellow vegetable and one citrus fruit); and 4 servings of bread and cereals (one serving equals 1 slice of bread or 1 oz of cereal).

It is desirable to consume the recommended number of servings from a variety of foods in each of the basic food groups every day to assure that a sufficient quantity of all the needed nutrients is ingested. However, if players decide to eat at fast food places for a few days, their health or performance will not be affected as long as a daily average over a period of 10-14 days equals the number of recommended daily servings.

Food labeling on commercial products is used to identify the percentage of each of the nutrients contained within the product. Players can make valuable use of this labeling information for recording consumption of nutrients on a daily basis.

One other use that can be made of the labeling information is to compute the percentage of calories from carbohydrates, fats, and proteins. For example, the label on a jar of peanut butter discloses that one serving (2 tbl) contains 8 grams of protein, 6 grams of carbohydrate and 16 grams of fat and has 200 calories. Since 1 gram of carbohydrate and 1 gram of protein each equal 4 calories and 1 gram of fat equals 9 calories, it can be determined that fat comprises 72% (144 cal), protein 16% (32 cal), and carbohydrate 12% (24 cal) of the total calories in the serving.

When one considers that carbohydrates should comprise 60%, protein 10-15%, and fats less than 30% of the total calories consumed on a daily basis, peanut butter is a product excessively high in fat and should be eaten in moderation. As a matter of fact, it takes a concerted effort to keep fat consumption under 30% due to the high density of fat (9 calories per gram), the hidden fat in such common foods as meats, pastries, and eggs, and the amount of fried foods consumed by the average American.

Carbohydrates

Sugars and complex carbohydrates are the most efficient source of energy. They are almost exclusively derived from substances of plant origin. The best carbohydrate foods are the complex, starchy, unrefined carbohydrates: whole

grains, pastas, cereals, vegetables (peas and beans), and nuts. Not only do they provide carbohydrates but they also contain fiber and all of the vitamins and minerals necessary for metabolism. While the sugars (candy, pastries, sugar-coated cereals, etc.) can be absorbed quickly, they contain little in the way of vitamins, minerals, and fiber and contain considerable fat.

During the digestive process, carbohydrates are broken down into glucose and carried by the blood to individual cells to be used as a source of energy. If the amount exceeds that needed for energy, glucose is converted to glycogen and stored in the liver and muscles. Glycogen stored in the liver can be sent to other tissues, but glycogen stored in muscles can be used only by the muscle in which it is stored. Glycogen that cannot be stored is converted to fat and stored in adipose tissue.

The quantity of stored carbohydrate in the body is severely limited. There are only about 20-50 calories of glucose in the blood, about 300 calories in the liver, and about 1000 calories in muscles, although as players become better trained during the season muscle glycogen may double (Williams, 1988). When this total supply is compared with the normal expenditure of 3000-5000 calories of energy/day by a basketball player, it is obvious that carbohydrates are not the major source of energy in the body.

Researchers indicate that a diet high in carbohydrates will nearly double the supply of glycogen stored in the liver and muscles. This discovery has led to carbohydrate loading (a superingestion of carbohydrates) for activities such as marathons and triathlons which last more than two hours. Because of basketball's intermittent type of exercise and its limited duration (less than two hours), there does not appear to be any evidence that carbohydrate loading is of value to the basketball player (McArdle, Katch, & Katch, 1991). Since the body has very limited ability to produce glucose from sources other than carbohydrate, basketball players must maintain glycogen stores through the intake of sufficient quantities of carbohydrates.

Carbohydrate is the most important energy source for basketball players. Not only is it the only fuel used during anaerobic energy production, it also utilizes less oxygen than does fat during aerobic exercise. In addition, the metabolic pathways for carbohydrates are more efficient than those for fat. Essentially, carbohydrate is able to produce ATP for muscular contraction more rapidly than fat (Williams, 1988).

When a player engages in basketball (at 70-80% of her VO_2 capacity), she uses carbohydrate as the preferred fuel (Williams, 1988). When fatigue becomes evident in the latter stages of the game, it is generally associated with an inadequate supply of body carbohydrate due to lack of dietary ingestion or

depletion of muscle glycogen through exercise. There is indication that a higher carbohydrate intake delays the advent of exhaustion and permits athletes to train harder. Williams (1988) reports that endurance athletes who train one to two hours per day need about 500-600 grams of carbohydrates in the daily diet to replace glycogen stores to maintain a quality training program. Therefore, basketball players may need to increase their daily intake of carbohydrates to 65% or 70% of daily caloric intake in order to provide adequate muscle and liver glycogen reserves (McArdle, Katch, & Katch, 1991; Katch & McArdle, 1988).

The addition of glycogen stores causes an increase in body fluids because 3 grams of water are bound to each gram of glycogen. The increased water retention may cause a slight elevation in body weight. Storage of 300 grams of glycogen and 900 grams of water will increase body weight by 2.5 pounds. Coaches should be aware of this characteristic when players commence a high carbohydrate diet.

Fats

Fats also are a source for energy and necessary for vitamin absorption (vitamins A, D, E, and K). Fats are composed of a glycerol base and one to three fatty acids. Triglycerides (three fatty acids) represent 95% of the fats in food products.

Sterols are a related lipid group which includes cholesterol, a lipoprotein synthesized in the liver and essential for many body compounds. Dietary cholesterol is found in foods of animal origin. Because high levels of cholesterol and triglycerides in the blood have been established as leading contributors to coronary heart disease, a reduction in the amount of fats that are ingested by Western society is recommended. Whereas most Americans ingest between 40% and 45% of their total daily calories in fat, it is recommended that this figure be reduced to less than 30%. Some cardiologists suggest reducing fat intake to less than 20% of the total calories eaten per day.

Fat in the body is increased whenever the caloric intake is greater than the caloric expenditure. It includes the fat ingested as well as excess amounts of carbohydrates and protein which are converted to fat when not needed by the body for other functions.

Fats are absorbed primarily as triglycerides and carried by the lymph to general circulation and to the liver. There they are converted to lipoproteins (given a protein covering so that they are more soluble) and carried to the cells in the blood as very low density lipoproteins (VLDL). Once they reach the cell

they are used for energy, stored as fat, incorporated into the cell structure, or used to synthesize body components.

A female athlete with a normal percent of body fat has readily available fat stored in the body. Stored in adipose cells is the equivalent of 75,000-100,000 calories; 2500 calories in muscles; and less than 100 calories in blood (Fisher, 1990). In contrast, the carbohydrate energy reserve is less than 2000 calories (McArdle, Katch, & Katch, 1991). The high caloric value of fat is due to its density (more than twice that of carbohydrate and protein) and to the abundance of adipose tissue in the body. Hence, there is a huge reservoir of triglycerides available and fat depletion during exercise is not a concern for the basketball player (Williams, 1988).

Proteins

Protein builds and repairs body tissues, regulates body activities, and is a source of energy. Protein is composed of amino acids which combine in ways to produce different types of tissues (hair, skin, muscle). Because all 20 amino acids must be present in the body to produce tissue, the absence of one or more amino acids impairs the ability of the body to develop protein tissue.

Some proteins are structural and form the shape of body parts while others have contractile abilities and form muscle tissue. Other proteins are transporters and form substances such as hemoglobin which transports oxygen. Other proteins serve as catalysts in the form of enzymes and hormones to produce cell reactions.

Nine of the 20 amino acids are essential (ones the body cannot produce) and must be included in the diet. Each amino acid contains an amino group (NH_2), a carboxyl group (COOH), and a hydrogen atom. The nitrogen in the amino group comprises about 16% of protein. The end products of protein metabolism are the same as carbohydrate and fat—carbon dioxide, water, and energy. In addition, the body must eliminate the nitrogen which is excreted through the urine as urea.

Both animal and plant foods contain amino acids. Animal protein is higher in quality because it contains all of the essential amino acids and it contains a greater quantity of them in the correct proportion. A wide variety of vegetables must be eaten in order to obtain all of the essential amino acids. A supplement of a small amount of meat enhances the efficiency of vegetable protein. A vegan (strict vegetarian) must be careful to integrate complementary proteins into the diet, preferably at the same meal. A protein low in one amino acid should be eaten with one that is high in the same amino acid.

Ovolactovegetarians who eat both eggs and milk products have little difficulty in obtaining all of the essential amino acids.

Amino acids found in the liver in excess of body needs may be converted to glucose by a process known as gluconeogenesis. The amount converted is small and probably contributes less than 5% of the energy used in exercise.

Basketball players need about .36 grams of protein per pound of body weight. A 120 pound athlete needs 43 grams per day and a 155 pound player needs 56 grams per day. Basically, about 10%-15% of one's daily diet should consist of protein (Althoff, Svoboda, & Girdano 1988). There is conflicting evidence about the need for additional protein during the growing years. Athletes who are on a low protein diet or who are reducing weight through a modified starvation diet may encounter periodic protein deficiency with the result that more nitrogen is being excreted from the body than ingested. As a result, muscle tissue and hemoglobin may be lost with an accompanying loss of muscle strength and endurance. Although a low caloric diet rarely occurs with basketball players, coaches should be aware of the problem, particularly when players are encouraged to lose weight.

More often, however, there is an excess of protein consumption by Americans. Some athletes who have adopted a high protein diet (200-400 grams/day) may suffer from dehydration in exercise due to the need to excrete excess nitrogen as urea in the urine. Those athletes who consume large quantities of animal protein are also ingesting considerable fat and cholesterol which may contribute to coronary heart disease. The consumption of large quantities of specific amino acids by athletes to enhance muscle development poses concern. The long term effects are unknown, but evidence exists that there may be tissue damage, interference with the absorption of other amino acids, and a suppression of appetite (Williams, 1988). Lamb (1984) reports that protein supplement does not increase energy available during practice and games and that protein contributes insignificantly to exercise effort.

Vitamins

Vitamins are a diverse group of 13 known nutrients, needed in very small amounts because they cannot be synthesized in the body. They are essential for health and are classified as water soluble (B group and C) or fat soluble (A, D, E, and K). Vitamins and protein combine to form an enzyme which serves as a catalyst for inducing metabolic changes. Vitamins do not contribute to body structure nor do they produce energy. Hence, they have no caloric value.

The vast majority of Americans obtain the RDA (Recommended Dietary Allowances) for all vitamins through their daily diet. With the possible exception of those who are on low calorie diets such as wrestlers and gymnasts, athletes also obtain the RDA for vitamins. There is no general support that vitamin supplementation improves physical performance (Lamb, 1984; Williams, 1988). As a result, healthy basketball players who are eating a balanced diet have no need for vitamin supplementation. If a coach is aware that a player has an impaired ability to absorb fat or an intolerance for dairy products, a one-a-day vitamin may be beneficial to the player.

Vitamin sales, however, are big business. It is estimated that 35-40% of the American population purchase some form of vitamins at a total cost of several billion dollars per year. Advertisers suggest that vitamin supplements will prevent colds and cancer and reduce high blood pressure. Targeting specific sports, marketing techniques use ploys, such as, "You don't play tennis with a golf ball, so why should the vitamin needs of a tennis player be the same as a golfer?" Excess ingestion of fat soluble vitamins may lead to toxicity because they are stored in the body. Excesses of water soluble vitamins cannot be stored in quantity and are excreted in the urine. The general consensus among researchers is that the best means to acquire adequate vitamins is to eat a well balanced diet. Megadoses of vitamins are unwarranted and may prove harmful. Fisher and Johnson (1990) suggest that as athletes increase their food intake, vitamin intake is automatically increased and provides athletes with all the vitamins necessary.

Minerals

There are 21 essential minerals required by the body for metabolic processes, formation of bone and connective tissue, hemoglobin, and enzymes. Minerals needed by the body include: sodium, potassium, phosphorous, magnesium, calcium, chloride, and iron. Other minerals are also necessary but in smaller amounts. The RDA for all minerals is available through ingestion of a well balanced diet. Minerals are found most often in the form of salts and break down into their constituent elements when dissolved in water. These mineral elements, then, become ions and are known commonly as electrolytes.

Iron

Iron is the mineral most likely to be deficient, particularly in women and teenagers. Sources of iron include red meat, dried fruits, beans, and whole

grain cereals. Products in the bread and cereal group which are "enriched" or "fortified" with iron provide two-thirds of the iron in the American diet. An enriched product has iron added to the processed flour in an amount equal to that which existed before refinement. Fortified products have iron added generally equal to 100% of the RDA for women. For this reason, it is important that women consume, at the very minimum, the recommended four servings per day in the bread and cereal group. In order to acquire the recommended amount of iron in the diet daily (18 mg/day) women need to consume between 2500-3000 calories per day. This is because foods contain 6 mg/100 calories but only 10% of ingested iron is absorbed.

Evidence exists that 50-80% of female athletes, particularly distance runners, have low serum iron levels (Williams, 1988). A number are anemic although most have normal hemoglobin levels. Contributing to these low levels are iron loss through menstrual flow and hematuria, a condition in which hemoglobin is found in the urine. The latter may be caused by repeated contact of the foot with the ground which may rupture some red blood cells, releasing hemoglobin. Hematuria is more often found in endurance runners, but is a condition of which basketball coaches should be aware. Preseason endurance training outdoors on hard surfaces or lengthy indoor training on resistant surfaces may induce this condition.

Based on the importance of iron to the oxygen transport system and capacity for endurance, Williams (1988) summarizes the research related to the value of iron supplementation for improving performance. If the individual suffers from iron-deficient anemia, iron supplementation should correct the situation and improve endurance capacity. If an individual is iron deficient but nonanemic, iron supplementation improves the iron status but does not affect performance except possibly in distance runners. More research needs to be conducted in this area. If the individual has normal hemoglobin levels, supplementation does not improve performance.

Evidence suggests that basketball players who suffer from iron-deficient anemia should be referred to a physician for iron therapy. Although there may be mechanical destruction of red blood cells through vigorous practice sessions and some loss of iron through sweat, it does not mean that all athletes suffer from "sports anemia." It does suggest, however, that the iron status of players should be monitored. Because females have a relatively high iron requirement, and because some may consume inadequate dietary iron, any increase in iron loss with training may cause a strain on limited reserves (McArdle, Katch, & Katch, 1991). In the absence of anemia detection through a blood testing program, Lamb (1984) suggests that iron supplements be

taken by female athletes age 19 and over who engage in heavy training and who are menstruating regularly. Ferrous sulfate is recommended. If taken with orange juice, vitamin C increases its absorption. It should also be taken with a meal for greater absorption. Coaches should monitor iron supplementation because excessive iron can accumulate to toxic levels and cause serious side effects.

Calcium

There is increased concern for female athletes with secondary amenorrhea (cessation of menstrual flow for long periods of time) which results in a negative imbalance of calcium and the early onset of bone demineralization. The decrease in bone mass and density resembles bones of women beyond 50 years of age and contributes to stress fractures. This problem most frequently occurs with female gymnasts, cross country runners, and ballet-type dancers.

Bone loss leading to possible stress fractures is a concern for basketball players who fail to ingest sufficient quantities of calcium in their diet. Players who have an intolerance for dairy products or who fail to eat green, leafy vegetables may incur bone demineralization. Bones of the lower extremity are susceptible to stress fractures due to running and jumping on hard surfaces. Coaches should inform players about the need for a well balanced diet and, in some way, monitor their eating habits. Four glasses of skim milk provide the 1200 mg of calcium needed daily by female athletes.

Sodium

Sodium is a positively charged ion found in extracellular fluid which accounts for most of the osmotic pressure that keeps water from leaving the blood and entering the cell. The osmotic pressure balances a pressure caused by potassium in the cell which keeps water from leaving the cell. Under normal conditions the body can maintain the appropriate balance between sodium outside the cell and potassium inside the cell to regulate water balance.

Sodium is consumed primarily as sodium chloride (table salt). The RDA for salt has not been established but the common intake far exceeds what is needed. High content of salt is found in all canned goods, cereals, ham, and other foods of animal origin. Additional amounts are commonly used to flavor foods, both in cooking and at the table. The estimated intake for most adults is about 3000 mg of sodium per day which is ten times more than what is

needed to maintain sodium balance. Thus, there is ample sodium in reserve when salt is lost through perspiration as sweat contains less than 1% of salt.

Because the incidence of hypertension (high blood pressure) is so great in America, the general public and athletes are encouraged to restrict the intake of salt in the diet. Mild restriction can be accomplished by eliminating the use of salt at the table. Even during exercise when considerable fluids are lost, sufficient sodium (and potassium) is retained to maintain the proper electrical gradients across cell membranes. The electrical difference between intracellular and extracellular fluids is essential for the transmission of impulses to the cells (McArdle, Katch, & Katch, 1991).

Water

Water is the most vital of all nutrients. It has no caloric content and does not provide energy for exercise, but it is necessary for all energy production, cell metabolism, transportation of nutrients and waste products (in blood), and temperature regulation. Life is sustained only when other nutrients react with water.

Water comprises about 50% of total body weight. Basketball players with a low percent of body fat may increase water content to as great as 70% of total body weight because water content of muscle is higher than that of fat (Williams, 1988).

Water is stored inside body cells (intracellular), and the extracellular water is stored between body cells (intercellular), in blood (intravascular), and to a lesser degree, in other compartments in the body. Water is gained primarily through the intake of fluids but an amount equal to the normal intake of fluids is gained from water in food and the production of water (metabolic) as carbohydrates, fats, and protein are metabolized for energy.

Water is lost primarily through perspiration and urine. The use of diuretics (including caffeine and alcohol) increases water loss through urine. High protein diets also increase water loss due to the additional amount of nitrogen (as part of amino acids) present and the increased amount of urea which must be excreted.

The average adult needs approximately two quarts of water per day under normal exercise and environmental conditions to maintain the proper body-water balance. Williams (1988) reports that the maximal sweat rate for trained athletes is about 2-3 liters per hour. Two liters is the equivalent of 4.4 pounds. A player who weighs 150 pounds may lose 3% (4.4/150) of her body weight. Dehydration of more than 2% of body weight impairs aerobic endur-

ance (Lamb, 1984; Williams, 1988). Therefore, it is essential that coaches not only encourage basketball players to drink sufficient quantities of water, but provide them with frequent "water breaks" during practice sessions.

Energy

Energy, which is the ability to perform work, is derived from the sun and can neither be created nor destroyed. It is converted into chemical compounds by plants and animals and enters the body in the form of carbohydrates, protein, and fat. These nutrients are broken down (metabolized) and the stored energy is released. Energy sources in foods and the energy expended by humans are commonly measured in units of heat expressed as kilo-calories or more commonly referred to as calories.

Energy is used constantly in the body for all physiological and metabolic processes which depend on the combustion of nutrients present in the cells to liberate energy and its by-products, carbon dioxide and water. Part of the energy is in the form of ATP (adenosinetriphosphate) and the rest is given off as heat. When energy is needed by the cell, ATP breaks down and energy is released.

Metabolism represents the sum total of all physical and chemical changes that take place within the human body. It includes the transformation of food to energy, the formation of new compounds such as hormones and enzymes, the growth and destruction of tissue, bone formation, and other processes. Metabolism involves, therefore, two basic processes: anabolism, the building process, and catabolism, the breaking down process. Anabolism allows complex body components to be synthesized from nutrients. Through the anabolic process players can gain an increase in muscle mass and an increase in cellular enzymes for using oxygen, among others. Energy is required for the anabolic process. Catabolism involves the breakdown of body components into a simpler form. The breakdown of glycogen to glucose and the subsequent production of energy is an example. Energy released from some catabolic processes provides the energy for anabolism.

The body is constantly using energy to build and break down substances within the cells. Contraction of the heart, breathing, secretion of hormones, and the activity of the nervous system are physiological processes that also use energy. Basal metabolism or the basal metabolic rate (BMR) represents the energy requirements of the various cellular and tissue processes that are necessary in a resting, postabsorptive state throughout most of the day. The resting metabolic rate (RMR) represents the BMR plus any additional energy

expended for digestion of food, exposure to the cold, stress, and sedentary activities. The BMR and RMR collectively account for 88% of daily energy expenditure in sedentary individuals (Williams, 1988). The other 12% is utilized for walking, standing, and other mild activities which Williams (1988) refers to as EMR (exercise metabolic rate). The active basketball player obviously expends greater energy during activity and the EMR may account for 30% or more of the daily energy requirement.

Energy Systems

Already noted are the storage of carbohydrates as glycogen and the presence of fat in skeletal muscles. When the central nervous system stimulates a muscle to contract, specific minerals serve as a catalyst for enzymes (proteins) to trigger the release of energy in the form of ATP. Some enzymes cannot promote the reaction without the aid of a coenzyme (generally a vitamin).

The greatest demand for energy occurs with physical activity. During the course of a practice session or game, players' energy demands range between 20-120 times that required during rest (McArdle, Katch, & Katch, 1991). The higher demands occur when players sprint down court and the lower levels occur during free throw attempts and other slow pace activities. The contribution by each of the energy systems depends on the intensity and duration of activity and the fitness level of the player.

The requirement for energy during exercise is related to the power-endurance continuum. Running a fast break and jumping for rebounds are examples of activities requiring power. The closer activities are to the power end of the continuum, the more rapid rate at which ATP must be produced. As activities move toward the endurance end, the rate at which ATP is produced does not need to be as rapid, but it must continue for a longer period of time.

There are three systems used to provide energy. Immediate energy is provided through the ATP-CP system, short term energy through the lactic acid system, and long term energy through the aerobic system.

Running the fast break and sprinting during a full court press are examples of situations which are high intensity and of short duration. Energy is provided almost exclusively by the high energy phosphates, creatine phosphate (CP) and adenosine triphosphate (ATP), stored in the muscles which are used during exercise. Phosphates are in short supply and their concentration in muscles lasts only a few seconds. For sustained activity and for recovery from

an explosive activity, ATP must be replenished for activity to continue. The stored carbohydrates, fats, and proteins continually replenish the phosphate pool.

The lactic acid system provides about 50% of the energy required for basketball activities from 30 seconds to about 2 minutes in length (McArdle, Katch, & Katch, 1991). The energy comes primarily from glucose and stored glycogen during the anaerobic process of glycolysis with the resulting formation of lactic acid. McArdle, Katch, and Katch (1991) report that sprint-like training promotes an increase in enzymes of the anaerobic pathway, but that the changes resulting from endurance-type training promote changes in aerobic enzymes which produce more impressive results. Running between lines, "suicides," and other sprint-type drills done in practice help to increase the anaerobic delivery of energy, while running distances or playing full court helps to improve the ability of the aerobic system to deliver energy.

The energy released through glycolysis is rapid and requires no oxygen, but relatively little ATP is resynthesized. Hence, aerobic reactions are necessary to provide energy transfer for vigorous play which proceeds beyond several minutes. Glucose, glycogen, and free fatty acids (FFA or fats) are broken down with the assistance of enzymes and coenzymes and combine with oxygen to form carbon dioxide, water, and ATP. By utilizing oxygen, the process is known as aerobic and results in the production of considerably more ATP. The aerobic process is one which is used for less than maximal exercise and can be continued for prolonged periods of time. It is the system which contributes most of the energy for basketball players.

While each of these systems predominates in certain kinds of exercise, all three are interwoven to provide an unknown linkage. What is known is that the body switches smoothly from one system to another in an overlapping manner. The body does not deplete one source of energy and then change to another (McArdle, Katch, & Katch, 1991).

Since there is considerable fat and lesser quantities of carbohydrates and protein stored in the body, fat is used extensively. However, carbohydrate ($C_6H_{12}O_6$) has greater oxygen content per atom of carbon than a typical free fatty acid ($C_{16}H_{32}O_2$). The low relationship of oxygen to carbon requires greater quantities of oxygen to break down fatty acids and the process is slow. Therefore, in times of strenuous activity, carbohydrate catabolism is required for fats to be metabolized continually for energy. To this extent, "fats burn in a carbohydrate flame" (McArdle, Katch, & Katch, 1991). When glycogen stores dwindle, fatigue occurs and the level of intensity of practice must decrease. It is through the catabolism of both fats and carbohydrates that

energy reserves are replenished so that players can continue to practice for extended periods.

Implications for Basketball

Basketball is a game which has intermittent activity, that is, there are numerous stops and starts due to violations, fouls, and substitutions. To this extent, there are series of short spurts of activity. There also are periods of prolonged action without whistle interference. Basketball involves power and explosive activities such as all-out sprints, rebounding, and other jumping activities. The game also requires endurance to allow players to continue to play effectively for long periods of time. Thus, the interplay of the anaerobic and aerobic energy systems is important.

As a result, coaches should plan training and practices so that athletes engage in both types of activities to improve the development of anaerobic and aerobic catabolism for resynthesis of ATP. This means that training in sprint-like activities as well as running distances or full court play is necessary for proper conditioning for improved performance.

Coaches also should be aware of the necessity for players to eat balanced meals on a daily basis. The old adage "You are what you eat" is particularly important for coaches and athletes to understand. Encouragement of players to increase their carbohydrate intake during the season is particularly important. Coaches also should be aware of the possible reduction of glycogen stores after extremely vigorous practice sessions or games. To maintain the desired level of performance, it is necessary to intersperse vigorous with less vigorous practice sessions.

Effects of Carbohydrate Ingestion Before and During Exercise

As noted earlier, blood glucose, liver, and muscle glycogen are the main storage areas for carbohydrate in the body. Blood glucose is in short supply and must be replenished from liver glycogen stores. A depletion of liver glycogen may lead to hypoglycemia, resulting in a feeling of weakness. Both hypoglycemia and muscle glycogen depletion have been identified as causative factors in the development of fatigue.

Numerous studies have been conducted to determine the effects of carbohydrate ingestion on exercise. Controls and methodology have differed but certain conclusions can be drawn. Basketball players who have an ample store of glycogen in the muscles and liver should have an adequate supply of

carbohydrates for competition. To be doubly sure, one or two days prior to competition, basketball players should ingest substantial amounts of carbohydrates and coaches should decrease the intensity and duration of practices to assure ample glycogen stores (Williams, 1988).

Contrary to superstitions expressed by some athletes, simple sugars should not be consumed 30-120 minutes prior to exercise. The increased concentration of sugar in the blood may cause hypoglycemia by stimulating the secretion of insulin, causing glucose to enter body cells from the blood. The same insulin response may also cause muscle glycogen to be used more rapidly (McArdle, Katch, & Katch, 1991; Williams, 1988).

Carbohydrate feeding during exercise at an intensity of 60% to 80% of one's aerobic capacity delays the onset of fatigue by 15 to 30 minutes. Findings indicate that carbohydrate feedings either conserve muscle glycogen for later use or maintain blood glucose for later use when muscle glycogen stores are depleted. Although there are numerous carbohydrate supplements on the market, none are more effective than glucose. Either glucose, fructose or sucrose (table sugar) may be used in solution. It is suggested that a solution made of 70 grams of table sugar in 140 ml of water be ingested 30 minutes after the commencement of practice or play and 8 ounces of a 5% solution be ingested in subsequent 30 minute intervals (Williams, 1990).

Body Temperature Regulation

Of concern is the maintenance of the core temperature (98.6° F) during exercise. This temperature should be maintained constantly and, as a result, the body must adapt during exercise as calories are burned and heat is produced.

The major concern for basketball players is hyperthermia or an increased body temperature. Hyperthermia is of particular concern during summer basketball camps conducted outdoors or in nonair-conditioned facilities with players who are not well trained at the time. During the season, facilities that are not well ventilated or those in which heat is kept high also pose concern. Spectators on game days increase arena temperatures.

Caution is advised when air temperature is in excess of 80° F. When humidity is above 50%, a temperature of 60° may be stressful. Humidity refers to the amount of water in the air and high humidity interferes with the evaporative process for cooling the body. Asphalt basketball courts increase body temperature in the summer due to conduction of heat from the playing surface. Body temperatures are also raised by the radiant heat from the sun.

It is important that coaches recognize conditions which may provide heat stress to athletes and how it may be alleviated. As the body core temperature rises, the main means for control is through evaporation of sweat. Athletes should be encouraged to wear loose fitting practice clothes. They might be encouraged to practice with shirts outside their shorts and with as much skin showing as possible to improve the probability of sweat evaporation. Perspiration that drips off the body or is wiped off with a towel provides no cooling effect. Therefore, players should be discouraged from "toweling off." It is also helpful to use fans to provide a slight breeze which will improve convection.

Sweat is approximately 99% water and the remaining 1% consists of minerals as electrolytes. Many commercial glucose electrolyte solutions (GES) are advertised to replace fluid and electrolyte loss. Examples of GES are Gatorade, Brake Time, Quickick, and Vitalade. Such GES solutions basically are composed of water, glucose and electrolytes. As the electrolyte content increases, water in the body moves in the wrong direction. Water is secreted by the cells rather than absorbed. As a result, these solutions delay water absorption. McArdle, Katch, and Katch (1991) suggest that "athletic drinks with sugar concentrations greater than 7% to 8% could present significant adverse affects for thermoregulation during prolonged exercise in heat." Plain water seems to be the best fluid to ingest to replace water loss.

Because blood levels show an increased concentration of most electrolytes during exercise, the ingestion of electrolytes is unnecessary and undesirable due to the increased loss of water by the cells (McArdle, Katch, & Katch, 1991). Despite suggestions to the contrary, salt tablets need not be ingested by the acclimatized athlete. There is no evidence that cramps may be prevented or cured with the ingestion of electrolytes or salt tablets. Even during prolonged exercise (including marathons), electrolyte deficiencies do not occur. Athletes who eat a well balanced diet replace minerals lost during exercise.

More recently, glucose polymer solutions (GPS) which contain maltodextrins have been marketed. They are designed to provide carbohydrates without increasing the osmolality of the solution, thus minimizing the effect on water absorption. Examples of these solutions are Exceed, Carboplus, and Max. Only when exercise is prolonged more than two hours do these solutions have a beneficial effect on water and glycogen replacement (Williams, 1988).

The best fluid replacement for basketball players is water between 40-50° F (Howley and Franks, 1986; McArdle, Katch, & Katch, 1991). Cold water is preferable to warm fluids because it is absorbed quicker. If carbohydrate is desired in the fluid, the concentration should be no greater than 5% (McArdle,

Katch, & Katch, 1991). This concentration can be accomplished by mixing cola-type drinks with an equal part of water or adding two parts of water to fruit juices. Fluids should contain little or no electrolytes so that absorption is not deterred.

To help prevent dehydration during practice or a game, athletes should hyperhydrate by drinking 16-32 ounces of cold fluids before exercise (Lamb, 1984). Every 10-15 minutes during exercise the athlete should rehydrate with 6-8 ounces of fluid. It is important to start rehydrating before the sensation of thirst becomes apparent. By then, an athlete has already lost 1-2% of body weight and performance may already be impaired (Williams, 1988). Lamb (1984) indicates that it takes 24-36 hours to voluntarily rehydrate following dehydration of 4.0% to 7.5% of body weight.

Based on these guidelines coaches should emphasize the importance of hydration and schedule periodic breaks in practices for ingestion of fluids. Under no circumstances should fluids be withheld from athletes. Athletes should be encouraged to drink more water than they want and prior to the time when thirst sensation occurs.

Eating Disorders

Basketball coaches should be aware that eating disorders are a significant problem among athletes at the collegiate level. The National Collegiate Athletic Association has recently released the incidences of eating disorders among female collegiate basketball players (NCAA News, 1990). Of the 762 institutions which compete in basketball, 101 or 13% reported at least one case of an eating disorder among basketball players. The two most common disorders are anorexia nervosa and bulimia.

Many coaches place considerable emphasis on athletes attaining (and maintaining) a designated lean body mass. The same coaches often find it difficult to tolerate athletes with 20% (or higher) body fat. These coaches are particularly likely to influence athletes to induce weight loss by any means available. Examples can be cited of coaches who give a T-shirt to the "porker" of the week; force fat players and thin players to run as separate groups for conditioning purposes; make comments to athletes about cellulite deposits; or conduct weekly weigh-ins and praise players who have lost weight and offer snide remarks to those who have gained weight. Although a single comment probably will not change eating behaviors, sufficient stress may trigger a eating disorder among susceptible athletes.

Loss of weight should be encouraged only for those who have a high percent of body fat. As players are encouraged to lose weight, direction must be given to players on how to accomplish the desired goal. If the coach cannot provide that information, a nutritionist should be consulted. Players do not know what foods to eat or the number of calories to consume per day. They need guidance in how to select a reduced, but balanced diet. Players also must be guided to understand that the loss of more weight than is suggested is not beneficial or desirable. They must be reminded that as they train, a weight gain may be observed because muscle tissue weighs more than fat. Therefore, as they reduce calorie consumption, they may not lose weight but their percent body fat will be reduced. They will have achieved the desired goal.

Anorexia Nervosa

This disorder is characterized by a pursuit of thinness and preoccupation with foods. Frequently anorexics' body image is so distorted that they view their skeletal-like figure as grossly overweight despite obvious weight loss. They become excellent calorie counters, often play with their food at meal times, become hyperactive as a means to burn calories, become depressed, and exhibit obvious mood changes. Symptoms of anorexia are a weight loss of 20-25%, amenorrhea for at least three months, and finally symptoms of starvation appear, including anemia and electrolyte imbalance. If untreated, brain tissue deteriorates and death may result.

Bulimia

This disorder is characterized by alternate bingeing on large quantities of food (3000 to 20,000 calories) and then purging by self-induced vomiting or through the use of laxatives. Bulimics often eat surreptitiously and visit a bathroom immediately after eating.

In addition to the obvious detrimental effects of rapid weight fluctuations, symptoms also include amenorrhea, hair loss and electrolyte imbalance. Counseling and antidepressant drug therapy are common treatments.

Coaches must be aware that athletes are very susceptible to criticism about body appearance. Athletes, in general, want to please a coach and will make great sacrifices in order to do so. Coaches must be fully aware of the consequences if they implore athletes to lose weight without informing them about desirable lean body mass and nutritional habits that will maintain a well balanced diet and will not jeopardize their performances. Players who become

anorexic or bulimic often suffer stress fractures; frequent injuries, particularly muscle strains; and a general lack of energy.

Summary

The six basic nutrients (carbohydrates, fats, proteins, vitamins, minerals, and water) are interdependent in supplying muscles with fuel to carry out the demands of active basketball players. Without proteins in the form of enzymes, without the assistance rendered by minerals and vitamins during aerobic metabolic action, and without water (blood plasma) to transport the fuels to the cell and provide transport for oxygen, energy formation would be seriously impaired.

The importance of carbohydrates in the diet is well founded. Athletes, particularly, have need for increased intake of complex carbohydrates. Since these carbohydrates contain minerals and vitamins necessary for energy production, they are a better choice than simple sugars. Because of the large supplies of readily available fat in the body, no effort needs to be made to increase fat supply. As a matter of fact, teenagers and young athletes should reduce fat intake so as not to compromise their health over the years. In addition, excess carbohydrate and protein are converted to fat.

Due to the heat resulting from the production of ATP, particular attention must be given to the maintenance of the core temperature during exercise. Cool water should be available and athletes should be encouraged to ingest fluids before thirst commences. Every effort should be made to dissipate body heat through conduction and sweat evaporation.

Coaches should be aware that eating disorders in athletes are more prevalent than one wishes to admit. Anorexia nervosa and bulimia are conditions that may be induced by stress from academics and/or athletics. Players are particularly susceptible when coaches make demands related to weight loss. These diseases have long term and lifelong effects.

Although training remains as the single most effective way to improve performance, proper nutrition is necessary to ensure that the proper nutrients are available to the athlete when needed. Coaches must encourage athletes to pay greater attention to their daily diet and make necessary adjustments to acquire a healthy diet.

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Coaching Hints for Developing a Post Player

Anita Palmer

Team offense is based on solid fundamentals by each individual player. These offensive fundamentals include moves with the ball, such as passing, dribbling, shooting, drive moves, and moves by position for guard, forward, and post. Moves without the ball, such as cuts to get open and establishing offensive position, are also important building blocks for team offense.

Each individual player must consistently work on perfecting these fundamentals in order to contribute to team success. A position essential for building team offense is the post. Therefore, the focus of this paper is a description of and hints for acquisition of the physical and mental characteristics of a successful post player. In addition, fundamental movements, strategies, and drills to enhance performance in a variety of post positions and against diverse styles of opponents are described.

In order to establish position and be able to receive the ball, the post player must be agile, strong, and physically fit. These attributes can be enhanced through a weight training and conditioning program which incorporates building flexibility, muscular strength and endurance, and cardiovascular endurance. These physical characteristics are the underlying base upon which the post player's offensive fundamentals are built.

Another attribute which must be developed in a post player is offensive aggressiveness, which is the desire to "want the ball" and to be an offensive threat. Moves with and without the ball can be practiced, but without the aggressiveness to attain the optimum position in the scoring and passing areas, the post player will not be able to take full advantage of this "center" position in team offense.

The post player must also be mentally disciplined. There will be a wide range of opponents, with varying degrees of size and defensive aggressiveness to which the post player must be able to adjust. The importance of being a versatile and complete post player is, therefore, apparent. Opponents may take away the post player's ability to shoot the jump shot, to drive to the basket, or to score off offensive rebounds. By learning the strengths and weaknesses of each individual opponent and team, the post player can adapt to a variety of styles of play. Such adaptation will, in turn, help the team be more successful against a variety of opponents.

Getting open to receive the ball with the back to the basket is the basic offensive fundamental move needed in the post position. The post player must be able to "post up," that is, to get the body in the desired position on the floor to be able to be open to receive the ball from a teammate. To do this, the post player must become familiar with the post area, including low, medium, and high post positions outside the lane, as well as the space inside the lane.

At the low post position, which is at and below the blocks on each side of the lane and includes the lower one-third of the lane, the post player must be able to get position in front of a defensive player. Then, the power move to the baseline side of the basket and the inside move to the middle of the lane can be executed by taking one step and a dribble, if needed, toward the baseline, or a pivot on the inside foot and the jump shot or short hook shot to the inside. The turnaround jump shot and the jump hook shot can also be executed over a defender who plays behind the low post player.

To establish low post position in front of a defender, the post player should be as "big" as possible at the blocks in order to create space in which to receive a pass. Being "big" means spreading the feet slightly wider than shoulder width, flexing at the knees and hips, keeping the head and back up, and using the arms and hands to "ask for the ball." The post player must ask for the ball with the hands and eyes. One hand and arm can be used to feel exactly where the defender is positioned, that is, to the high or low side. The other hand and arm are used to give a target to the passer. The perimeter player making the pass inside should pass to the open side. If the defender is playing behind but on the high side, the baseline side is open, and that is the side to which the pass inside should be made.

If the defender plays in front of the low post player, the lob move can be performed by "pinning" the defender with the forearm and then releasing to receive the lob pass. As the ball is passed from one perimeter player to the next, the post player can "seal" the defender by positioning the body between the defender and the open space to the inside, taking a step on the inside foot,

asking for the ball with the inside arm and hand, and receiving the leading pass in the middle of the lane.

From the low post position, the post player must also be able to make a "flash cut" from the weak side to the ball. By using fakes and quick, efficient cuts, the post player can get open inside the lane to receive the ball. The two most basic cuts are the flash cut and the spin move. In the flash cut, the defender is taken low by a fake in which the low post player takes a jab step toward the baseline. Then, a quick step is taken to the inside of the lane with the inside foot in order to get open to receive the ball. The spin move is executed by taking a step toward the baseline and then spinning with a reverse pivot toward the middle of the lane to get inside position on the defender. Both of these moves enable the low post player to create openings inside the lane.

Because shots taken from low post position are within five feet of the basket, the bank shot, the short jump shot, and jump hook must be learned. It is important for the low post player to develop a "soft touch" in the area close to the basket.

Another basic post position is the medium post, which is half-way up the lane on either side and includes the middle one-third of the lane. In order to get open to receive the ball at the medium post, the post player must be able to maneuver for position around several defenders who may be sagging-in to help out the primary post defender. The post position must be maintained against defenders who collapse-in on the medium post player; who lean on the post player from behind, in front, or at the side; or who change defensive position from playing behind and to either side depending on where the ball is on the perimeter. Being able to "be big" is also a key to getting position at the medium post, just as it is at the low post

Another way to establish medium post position is to make a V-cut from low to medium or high to medium post. To execute a V-cut, the post player uses change of speed in faking a cut inside the lane first, then making a quick cut to the medium post position. From here, the post player can shoot the turnaround jump shot to either side, do a power move to the baseline, or make a seal move inside to the middle of the lane.

The shooting range needed at the medium post position is a little farther from the basket than in the low post position. Therefore, the post player should also work on receiving the ball with the back to the basket, "squaring up" to face the basket with a pivot to either side, and shooting the 5–10 foot jump shot.

The high post position at the top of the free throw lane opens up three additional elements to the post player's game. One element is the drive move

to the basket after receiving the ball, pivoting and squaring up to face the basket from the top of the key. Another element is the pass from the high post to the open teammate inside or outside the lane. The third element is the 15 foot jump shot from the top of the key.

To get open at the high post, the player usually must get position on a defender who has one hand in the passing lane from behind or slightly to the side of the post. Additionally, there is often a "hand in the passing lane" to the high post from the defender out top, such as the weak side guard. Asking for the ball with the hands, being ready to receive the ball, and re-positioning the body as the ball moves are vital offensive fundamentals at the high post.

To maintain the high post position, the post player can take a step or make a fake as if to go low, then step back to the high post. Also, the high post can move from one side of the top of the key to the other with changes of speed and a small V-cut into the lane.

Passing should be incorporated from all three basic post positions, but especially from the high post. Willingness to pass to the open player, awareness of where the weak side teammates are, and looking for the low post player are three high post passing fundamentals that are especially important. Effective passing techniques are also essential, especially facing the receiver and making accurate and catchable passes.

The 15 foot jump shot facing the basket, as well as the jump shot after pivoting to face the basket, are two shots at the high post. The drive to the left or right, followed by the short jump shot, is another high post move.

From the high post, the player can also make a cut to the medium or low post, or to the inside of the lane. Also, the high post can make a cut from that position to get the lob in the low post for the easy inside shot.

After the post player has learned where the three basic positions are and the stance at each position, the post player should practice getting into position from a fast break, an early transition, a patterned offense, a passing game, and a free lance offense. Next, the specific moves from each of these positions should be practiced. The following is a sample individual workout for practicing these moves.

1. Establish low post position, then:
    a. receive the ball, power move to the basket
    b. receive the ball, seal move, and jump shot or jump hook
    c. receive the ball, turnaround jump shot to baseline side
    d. receive the ball, turnaround jump shot to middle of lane
    e. receive the ball, jump hook to baseline and to inside

   f. flash cut into lane from weak side, receive ball, then short jump shot or jump hook
2. Establish medium post position, then:
   a. receive the ball, turnaround jump shot to baseline
   b. receive the ball, turnaround jump shot to inside
   c. receive the ball, power move to baseline
   d. receive the ball, then jump hook to inside
   e. then pin the defender who is fronting, receive lob pass, shoot
   f. flash cut inside lane, receive ball, short jump shot or jump hook
3. Establish high post position, receive the ball, then:
   a. pivot, shoot 15 foot jump shot
   b. pivot, drive right
   c. pivot, drive left
   d. pass to teammate, receive pass back, shoot or drive
4. Post up at low, medium, and high post positions, then:
   a. cut into lane to receive pass, then shoot
   b. cut into lane, move to a new post position, establish position, ask for and receive ball, shoot, drive or pass

These drills should be practiced without defense, and then with a passive defense. As the moves are perfected the defense should be allowed to become more aggressive. Double-teaming as well as zone defense should be included.

Thus, the post player who practices in a variety of positions and learns to adapt to many offensive patterns will become a more complete and versatile player. Furthermore, in addition to these skills, the post player who perfects shooting, passing, and driving from all basic post positions will enhance the team's success.

"Looking" Better for Basketball

Darlene A. Kluka, Angela B. Lawson, and Phyllis A. Love

Coaches have traditionally evaluated a basketball player's ability through tests involving strength, power, and agility. On the basis of these evaluative tools, strength and conditioning programs as well as individual drills are designed and incorporated to assist in attaining peak performances. Historically, despite their importance, little attention has been given to the athlete's visual skills.

A coach begins to think about the athlete's vision when squinting or rubbing the eyes occurs, when foul shots which miss frequently hit the front of the rim, or when the athlete who regularly wears glasses off the court does not wear them on the court (Berman, 1988). The coach may recommend that the athlete visit the optometrist or ophthalmologist. The vision examination routinely includes a standard vision exam. This measures the athlete's ability to see 20/20 and can eliminate concerns of pathological difficulties. There should, however, be much more to a vision exam for basketball than determination of static visual acuity (SVA). Perfect 20/20 vision is an important factor, but not the most critical visual skill used to play the game.

The following visual skills seem to be of greatest importance for success in basketball and should be evaluated:

Visual Concentration: the ability to focus upon and "tune in" to the moment (Kluka & Love, 1989).

Fusion: the ability of the eyes to gather information separately but team together to integrate two images into one (Kluka & Love, 1989).

Tracking: the ability to move the eyes so that a moving object can be followed clearly (Revien & Gabor, 1981). The forward, waiting for the free throw to be shot by the opponent, follows the flight of the ball from fingertip release to contact with the basket in order to anticipate the rebound. This requires visual concentration, fusion, and tracking.

Accommodation: the ability to change focus instantly and smoothly as an object approaches (Revien & Gabor, 1981). A defensive player must change focus quickly and efficiently to attempt a steal, block a shot, or intercept a pass.

Convergence/Divergence: the ability to focus upon one point in space at a time (Kluka & Love, 1989). The player receiving the ball for a hook shot uses the eyes together to gain an accurate visual impression in three-dimensional space as the ball approaches (convergence) and when the ball is shot (divergence).

Depth Perception (stereopsis): the ability to judge the distance of objects accurately (Kluka & Love, 1989). The point guard uses this skill in order to determine her position from the goal and how much force to exert when shooting the three-point field goal.

Peripheral Vision: the width of the visual field and awareness of what is going on around while focusing straight ahead (Kluka & Love, 1989). During the fast break, the offensive player must be able to see the wing players and defenders so that the decision to keep the ball or dish it off can be made quickly.

Contrast Sensitivity Function: the ability to clearly distinguish a variety of sizes of objects under varying lighting conditions (Kluka & Love, 1989). Players' visual systems adapt differently to mercury vapor, recessed, or other lighting conditions; to gymnasia with and without natural light from windows and doors; and to small or large gymnasia. This may have an effect on their abilities to perceive appropriate stimuli for decision-making.

Eye/Body Coordination: the ability of the body to respond to the information the eyes have sent to the brain and provide an integrated response (Kluka & Love, 1989). To begin the game, the athlete executing the tip-off must time a stationary vertical jump with a tossed ball, and a pushing or pulling motion on the ball to direct its flight.

Eye Dominance: the eye which leads the other in seeing or fixation; it processes information to the brain approximately 14 milliseconds more rapidly than the other eye (Coren & Porac, 1982). The right-eye dominant player, receiving a pass from the right, may perceive information more quickly than a pass from the left.

Because basketball utilizes a variety of visual skills which are learned, sport-specific drills that use these skills can be easily incorporated into practice sessions while using a different focus.

Visual Concentration

Equipment: a toss back with a two-inch brightly colored circle placed in its center; one basketball; a coach or an assistant

Drill: Toss Back

Coach stands on the side of the toss back and raises one hand above the head. The player stands six feet away, facing the toss back, and dribbles the basketball. When the coach drops the hand, the player tosses the ball into the center of the toss back, catches the ball when it rebounds, and then continues dribbling. The drill is repeated ten times with each hand.

Visual Cues: When you are dribbling, focus on the coach's palm. Just before you toss, focus on the circle in the center of the toss back. As you catch the ball, focus on it as it arrives at your hands by using your eyes, not your head and your eyes. As soon as it arrives, focus immediately on the coach's palm again.

Fusion

Equipment: basketball court; 4 basketballs

Drill: Pivot Pass Drill

Using ½ court, begin with four lines (A, B, C, D). The first person in each line takes 2 to 3 dribbles to the middle of the floor. The coach gives the command "right" or "left" while the players dribble to the middle of the floor (Right = pivot right; Left = pivot left). Each player performs a jump stop and pivots in the direction of the command. Each then chest passes the ball to the person in the line she is now facing. Passer goes to the end of the line she just passed to. The next four players repeat and follow the coach's verbal command. (Figure 1)

Visual Cues: Focus on the belly button of the player who is straight ahead of you. When you pass, follow the ball with your eyes until the person catches it.

Tracking

Equipment: One basketball; one goal
Drill: Tip Drill using the backboard
Visual Cues: As you approach, look for the ball with your eyes, not your eyes and your head. Focus on the smallest area you can as the ball hits the backboard each time.

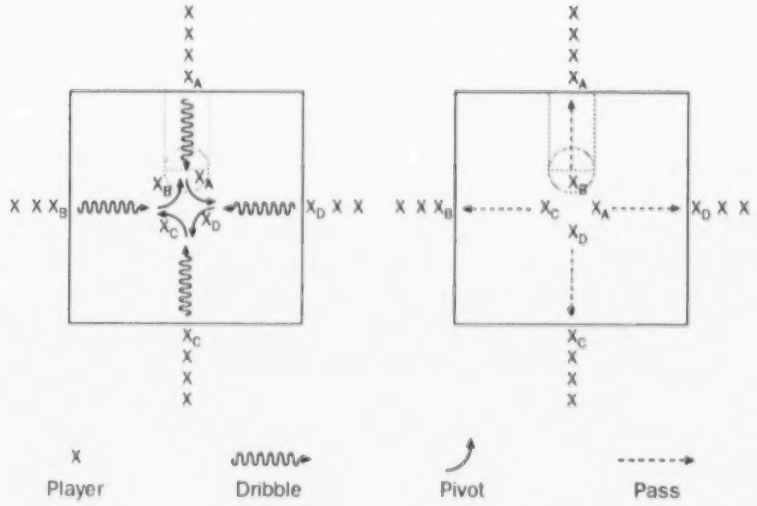
Accommodation

Equipment: Three basketballs; full court
Drill: Figure 8 Drill

Perform this drill eight times.

Visual Cues: Follow the pass with your eyes, not your eyes and your head, as it comes in to you. Look quickly at the spot you wish to pass to just before you pass.

Figure 1. *Pivot Pass Drill.*



Convergence/Divergence

Equipment: One basketball for every two players; place a 3 x 3 inch square on both sides of the goal so that when the ball hits the square when the layup is shot, it will rebound into the basket.

Drill: Passing

From one endline, pass the ball back and forth with a partner while running down the court. Whoever has possession of the ball at the other end of the court performs a layup. Reverse directions and repeat ten times.

Visual Cues: Focus on the player's hands you are passing to. Just before the layup, focus on the square that has been put up on the backboard. Lay the ball up so that it hits inside the square and goes into the basket.

Depth Perception

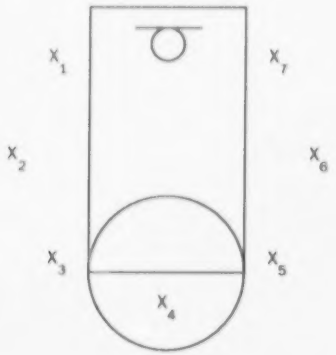
Equipment: One basketball; one basket per pair of players

Drill: Beat the Pro

Player A is the shooter. Player B keeps score and rebounds. Shooter gets one point per basket made. The imaginary Pro gets two points every time the Shooter misses. Starting on the baseline (X_1), Player A shoots from seven different areas. When X_7 is completed, reverse directions. Player B assumes player A's position after X_1 is completed twice. (Figure 2)

Visual Cues: Use your eyes to lock into the target, not your head and your eyes. As the ball is coming in to you, look it into your hands. Focus first, then pop the shot.

Figure 2. *Beat the Pro.*



Peripheral Vision

Equipment: One basketball; half court
Drill: Contest the Shot
The defense, shifting with the ball, continuously contests each shot, and blocks out players and/or gets the rebounds. Play until the defense stops the offense from scoring three times in a row. Change roles and positions.
Visual Cues: Focus straight ahead as much as possible; pick up information by using your peripheral vision. Use your eyes to gain additional information, not your head and your eyes.

Contrast Sensitivity Function

Equipment: Dimly lighted gymnasium on one end of the court
Drill: Full Court Game
With one end of the court well illuminated and the other end dimly lighted, play for 15 minutes. Keep track of the score; change baskets and keep score again. Compare scores between adequate lighting and dimly lighted areas.
Visual Cues: Focus on the smallest area target you can when going into the dimly lighted part of the court.

Eye/Body Coordination

Equipment: Half court; one basketball; rebound ring placed over the hoop
Drill: Half Court Game
Ball will automatically rebound from the basket. Play for five minutes. Offense and defense change roles.
Visual Cues: Use your eyes, not your head and your eyes, to locate the ball.

Eye Dominance

Equipment: One basketball per player; half court
Drill: Dribble, Pass, Receive, and Shoot
Practice dribbling the ball down the court on the right and left sides of the court, passing and receiving from both sides without change in head position. Shoot from the 135° and the 45° angles on either side of the basket in line with the free throw lane. Repeat ten times per side.
Visual Cues: Just before the shot, turn your head slightly so that your dominant eye is a little closer to the target than the other.

Several helpful observations can easily be noted by the coach.

- During practice and games, check to see if the athlete looks from the front center of the basket rim to the hands and back to the goal before shooting the free throw. Once ready to shoot, the athlete's focus should remain on the goal. These unnecessary eye movements can disrupt visual concentration and may create undue fatigue within the visual system when done repeatedly.
- Videotape each athlete during free throw practice sessions. Stand with the camera under the basket and face the player who is at the line. Zoom in to get a closeup of the face so that eye movements can be easily evaluated.
- Make comparisons of the eye movements under practice and game conditions. If the athlete, under the stress of competition, displays a noticeable difference in visual behavior, adjustments within practice to simulate more gamelike conditions might be beneficial.
- Record, in ten-minute segments of a game, the number of missed field goals. As the game progresses, the athlete's focus may need to be changed. As the player fatigues, focus may need to be changed from the front of the rim to the front of the back rim in order to provide a successful field goal.
- Note the amount and number of the player's head movements when playing. Turning the head to place the eyes in position to find the ball, another player, or the goal may increase a player's total movement time. Quickly executed eye movements help to improve quickness of movement.

Because approximately 70% of sensory input for basketball comes from the visual system (Morris & Kreighbaum, 1977), protecting the eyes from injury is critical. The coach should consider promoting eye guard wear during practice and games by making it part of the team uniform (Kluka, 1988). Selecting drills which employ visual as well as physical skills in an effort to enhance team success should be incorporated. Verbally cueing where to look, when to look, how to look, and why to look should be used. By focusing upon the visual components of the sport, the team has the opportunity to "look" better for basketball.

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How Does Your Flexibility Program Rate?

Mildred Barnes

Coaches involved with basketball teams recognize that athletes have different levels of playing ability. Athletes also have different body builds and different degrees of flexibility. Exercises which may be satisfactory for one athlete may be contraindicated for another. Although individualized programs of exercises for each member of the team are desirable, their implementation usually is not practical. Furthermore, most coaches do not have the clinical background to formulate individual prescriptions. Therefore, coaches must select those exercises which are safe for all athletes to perform.

Basketball coaches at all levels use exercises for pregame warm-up purposes or for stretching during practice sessions. As one observes players engaging in these exercises, it becomes apparent that some coaches are unaware of current beliefs about the safety of certain exercises.

Exercises that are hazardous or questionable must be eliminated. Certain exercises which were considered to be acceptable some years ago are now considered questionable (Althoff, 1988; Corbin & Lindsey, 1988). It is important that coaches "change with the times" and discontinue use of obsolete exercises.

Undesirable exercises contribute to ligament or cartilage damage, pinching of nerves and blood vessels, and compression of vertebrae (Corbin & Lindsey, 1988). Slight muscle tears occur when the integrity of the joint is compromised by repeated execution of undesirable exercises during the course of the playing season and over the ensuing years (Corbin & Lindsey, 1988). These injuries often become noticeable some years later (Lamb, 1984) after wear and tear takes its toll. Frequently these injuries are not attributed to previous sport indulgences, but are accepted as consequences of "old age."

Coaches and players alike generally understand the benefits of a flexibility program for improving performance. Increased range of motion at desired joints allows players greater leverage for basketball skills. Significantly, also, the development of range of motion beyond what is normally used during a game situation often precludes muscle injuries when a player is forced to move body segments beyond normal expectations. Thus, injuries are less likely to occur (Corbin & Lindsey, 1988; Howley & Franks, 1986; Williams, 1990).

Flexibility of ankles, knees, and hips is important in the absorption of forces occurring as a result of running and jumping. If these joints do not "give" sufficiently to dissipate the forces, the vertebral column must absorb some of the force. This causes adjustments to be made in compensating for the forces and leads to poor mechanics and joint damage (Howley & Franks, 1986). Although great emphasis is placed on cardiovascular endurance and, to a lesser degree, on the acquisition of strength, drills and exercises that improve each of these areas of fitness do not develop flexibility.

Range of motion is improved by engaging in activities designed to elongate soft tissue around specific joints and/or to elongate muscle tissue (Hoeger, 1987; Lamb, 1984; Williams, 1990). The soft tissue includes connective tissue encircling each muscle fiber and the sheaths of connective tissue around the bundles of muscle fibers and the muscle itself, tendons (connecting muscles to bones), and ligaments (connecting bones to bones). Connective tissue, including tendons and ligaments, is viscoelastic. The elastic property allows the tissue to return to its normal length after being stretched. The viscous property allows more or less permanent deformation, commonly called plastic elongation (Howley & Franks, 1986; Lamb, 1984). Muscle tissue, on the other hand, has considerable elasticity and responds to stretching by undergoing temporary or elastic elongation which improves the extensibility of the muscle (Hoeger, 1987).

Types of Stretches

There are three recognized means for developing range of motion—static stretching, ballistic stretching, and proprioceptive neuromuscular facilitation (PNF).

Static Stretching

Static stretching, which involves stretching a muscle slowly and holding the attained position for 10-30 seconds, is the preferred method (Allsen et al.,

1990; Hoeger, 1987; Lamb, 1984). The slow, sustained stretch causes muscles to relax and greater elongation of the muscle is possible. The slow stretch also promotes plastic elongation and causes fewer injuries (Allsen et al., 1989; Howley & Franks, 1986; Lamb, 1984; Williams, 1990). While maintaining stretches for relatively long periods of time (30 seconds), only small increments in range of motion should be expected at each session (Lamb, 1984).

Ballistic Stretching

Ballistic stretching involves the use of a bouncing action and momentum of a body part to cause the stretch. Howley and Franks (1986) and Hoeger (1987) suggest that slight tears in connective tissue may result when momentum causes the movement to exceed the joint's range of motion. In addition, muscle soreness may occur. Hoeger (1987) notes that ballistic stretching promotes uncontrolled movements which may result in ligaments becoming overstretched. This action leads to loose joints, increasing the possibility of injuries including dislocations and sublaxations. Howley and Franks (1986) and Lamb (1984) note that ballistic stretching invokes stretch reflexes of the stretched muscles which cause muscle contraction rather than elongation. This result is counterproductive since the muscle that is supposed to be lengthened is shortened. Hoeger (1987) indicates that most authorities do not recommend ballistic stretching for increasing flexibility.

Proprioceptive Neuromuscular Facilitation

Proprioceptive neuromuscular facilitation (PNF) has received attention in recent years as a means for increasing flexibility. The technique requires the assistance of another person and is based on a "contract and relax" method. The assistant provides an initial force by slowly pushing the body part in the desired direction. The initial stretch does not cover the full range of motion. The exerciser then applies force in the opposite direction (isometric contraction) for 4-5 seconds (Hoeger, 1987) while the assistant resists the force. The assistant then slowly increases the degree of stretch to a greater angle. The process is repeated until mild discomfort is felt. Lamb (1984, p. 373) indicates that the isometric contraction creates "reciprocal inhibition nerve reflexes to minimize contractile activity." This promotes muscle relaxation, resulting in greater muscle length. Howley and Franks (1986) point out that PNF techniques provide better results than static stretching, but PNF stretching has limitations. The protocol requires two people, injury can result if individuals

are not properly trained in its use, and the technique may induce significant pain.

For the reasons cited above, it appears that the best technique for basketball coaches to employ for improving flexibility of players is the static stretching technique.

When Should Stretching Be Done?

There is general agreement that players should warm up before engaging in stretching activities (Howley & Franks, 1986; Lamb, 1984). The temperature of soft tissue and muscles is increased and tissues become more flexible and less susceptible to injury (Allsen et al., 1989; Hoeger, 1987; Lamb, 1984). Therefore, stretching activities should be delayed at the start of practice until players have had an opportunity to engage in some type of warm-up activity. Stretching should be done also when the practice session or game is completed. At this time, muscles are flexible and stretching may decrease muscle soreness (Allsen et al., 1989; Howley & Franks, 1986; Williams, 1990).

Selecting Exercises

Since flexibility is joint specific, all major muscle groups should be stretched on a daily basis. The selection of exercises should be based on the purpose of each exercise and on how well each fulfills its objective. In addition, the coach must carefully analyze whether any exercise violates the integrity of joints or body mechanics. The coach should also evaluate the exercises in terms of other problems, such as balance and leverage, particularly in relation to the length of the resistance arm which influences the difficulty of the exercise.

In the following section some of the precautions which should be followed are noted. Common exercises which violate safety factors for group participation are identified and suggestions are provided for alternative exercises. Others may be used provided that they adhere to safety features.

Static stretches for increasing range of motion are suggested. Each player should perform the static stretch by going through the motion slowly until stress (not pain) is experienced. The position should be held for 10 or more seconds before returning to the starting position (Allsen et al., 1989; Althoff et al., 1986; Hoeger, 1987). Allsen et al. (1989) report that it takes at least six seconds to stimulate the sensory receptors that cause muscle relaxation, and as greater flexibility is attained, the player will be able to hold the stretch position for an increasingly longer period of time.

Neck

Generally, basketball skills require the head to be carried in the position suggested for any running activity. Most shooting, rebounding, and passing skills are executed with the head and neck vertically aligned with the trunk with a minimal amount of hyperextension (bending the head backward). Reverse layups and dribbling in a low crouch to protect the basketball require the head to be slightly hyperextended (chin raised). Young children and players who are not very tall frequently may be forced to hyperextend the neck more than a few degrees if playing on a court with baskets supported at regulation height.

Basketball skills infrequently require players to use neck flexion beyond a few degrees. Players who are learning to dribble may watch the ball (causing neck flexion), but this action is not desirable. During a game, players need to be able to rotate their heads to observe action to either side and to utilize minimal flexion and hyperextension under varying conditions.

Any neck exercise should avoid extreme hyperextension (Howley & Franks, 1986) since pressure is placed on neck arteries and nerves, causing a pinching effect which over time may wear down vertebral discs and aggravate arthritic conditions (Corbin & Lindsey, 1988). Extreme neck flexion (chin on chest) may also contribute toward the development of a "forward head." Extreme flexion of the neck while executing sit-ups can be minimized by placing the hands across the chest or the palms of the hands against the ears rather than placing the hands behind the neck (Howley & Franks, 1986).

Neck Circling. Circle the head sideward, forward, and sideward only. If complete circles are desired, do not allow the head to tilt forward or backward excessively.

Neck Rotation. Turn the head from side to side (rotate) while trying to extend eye vision further behind the body.

Chest and Arms

A number of playing techniques require players to reach forward to receive the basketball. Reaching action occurs when "asking" (stretching arms toward the ball) for a pass, reaching for a rebound when proper position has been attained, and reaching to gain an interception. As a result, it is important to stretch the chest muscles so that they do not become permanently shortened.

Pectoralis Stretch. While standing, abduct the arms (place them out to the side) and flex the elbows. Pull the elbows backward.

Shoulder Stretch. While standing, place the left arm behind the back with the elbow flexed and the back of the hand in contact with the back and as close to the neck as possible. Reach the right hand over the top of the right shoulder and grasp the left hand. Reverse position and repeat to the opposite side.

Arm Stretch. Extend the lower arms and cross the arms in front of the body. Turn the palms of the hands to face each other and grasp hands. Raise arms vertically overhead with elbows straight. Howley and Franks (1986) suggest that the arms should be kept in front of the ears and the knees should be flexed slightly to avoid tilting the pelvis forward.

Trunk

A number of basketball techniques require bending and rotation of the trunk. Rebounding and giving an outlet pass, intercepting passes, protecting the ball when double teamed, and executing a hook shot are examples. The following exercises are suggested for increasing range of motion.

Figure 1. *Shoulder stretch.*

Figure 2. *Arm stretch.*

Side Stretch. While standing with the feet shoulder width apart, lean the trunk toward the right side. Allow the right hand to slide down the right thigh as the left arm reaches over the head, causing the elbow to flex slightly. Do not twist the trunk. Repeat to the other side.

Trunk Twist. Sit with the left leg extended. Flex the right knee and cross the right leg over the left, and put the right foot on the floor. Support the body with the right hand on the floor behind the buttocks. Place the left arm across the thigh of the right leg. Turn the trunk as far as possible to the right. Reverse position and repeat to the other side.

Lower Back

Due to the considerable amount of jumping and reaching overhead that is involved in a basketball game, the lower back muscles often become "tight." In addition, weak abdominal muscles, tight hip flexors, or the practice of poor body mechanics may cause lordosis (an extreme lumbar curve) to develop. As a result, any exercise which causes lower back hyperextension such as double leg lifts and the single and double back arch should be avoided and alternate exercises to stretch the lower back should be used.

Inverted Bicycling. While lying on the back with arms at the sides, the legs are raised overhead and the athlete executes a bicycling action. The head, shoulders, and torso must remain on the floor as the player presses the lower back against the floor during the cycling action.

Figure 3. *Trunk twist.*

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Coaches should insist that the arms and hands remain on the floor. Do not allow players to support their hips with their hands, thereby causing the weight to be thrust onto the cervical area and forcing neck hyperflexion to occur.

Knee Pull Down. Lie on the back and flex the knees. Grasp under the thighs with the arms and pull the knees toward the chest. (Do not allow players to grasp the top of the shins to pull the knees toward the chest. It causes excessive knee flexion which can contribute to ligament and cartilage damage.) Tighten (contract) the abdominal muscles and press the lower back against the floor. This action may raise the shoulders slightly off the ground (2-3 inches), but do not flex the neck.

Wall Curl. Lie on the back close to a wall, raise both legs, and place the soles of the feet against the wall. Let the arms relax on the floor or across the chest. Press the lower back against the floor.

Knee Flex and Extend. Lie on the back with knees flexed and feet flat on the floor. Grasp under the knee of one leg and pull it toward the chest. Extend the foot toward the ceiling and hold. Replace the foot on the floor. Reverse position and alternate legs.

Reverse Sit-ups. Lie on the back with hips and knees flexed and feet flat on the floor. Extend the arms alongside the body with hands near the thighs and flat on the floor for balance. Raise the hips off the floor and bring the knees toward the chest. Do not allow the knees to go beyond the shoulders to induce neck hyperflexion.

Groin

Hip adductor muscles which lie on the medial side of the thigh are commonly called groin muscles. It is important to maintain flexibility to minimize the possibility of groin pulls. Groin injuries heal slowly and often require several weeks of rehabilitation. Prevention of this injury is important.

Groin Stretch. Sit with the soles of the feet together and knees flexed. Grasp the ankles with the hands and place the forearms on the thighs. Gently push the thighs toward the floor.

The Lower Extremity

The muscles of the thigh and lower leg are used constantly while jumping and running up and down the court. Not only is it important that leg muscles are

strengthened but they also must be stretched. While developing a flexibility program for the legs, it is important to recognize certain precautions which must be followed to prevent possible injury.

The knee joint is susceptible to injury in basketball due to the frequent pivoting, jumping and landing, and stops and starts that occur during a game. Rotation of the knee under any circumstance is undesirable. As a result, exercises such as "the hero" and "hurdle sit" which cause torque in the knee are contraindicated (Howley & Franks, 1986). Exercises in which the knee is flexed and the lower leg is lateral (to the side) cause this undesirable action and should be avoided. Howley and Franks (1986) suggest that hyperflexion can strain and stretch knee ligaments and place pressure on the meniscus. Alternate exercises should be used to stretch the quadriceps or hamstrings.

Basketball techniques commonly require players to flex knees to approximately 90°, but rarely, if ever, are knees voluntarily flexed beyond that range. Hence, there is no need to utilize exercises such as the hurdle-sit toe touching and the one-leg quadriceps stretch (the right knee is flexed and the right hand grasps the right foot to pull it toward the buttocks) which place undue stress on the integrity of the knee joint. Alternate exercises should be used. It is also suggested (Howley & Franks, 1986) that when a forward-backward stride position is used and the front knee is flexed, the front knee should be directly over or in back of the front foot.

Important muscles in running and jumping include those on the calf of the lower leg. The calf is heavily muscled while the anterior of the lower leg has little musculature. The calf muscles are used extensively as they cause knee flexion (gastrocnemius) and plantar flexion of the foot (gastrocnemius,

Figure 4. *The hero. This exercise is contraindicated.*

soleus, and tibialis posterior). There is evidence that stretching these muscles helps to prevent the development of shin splints.

When backward leg movements are used, hyperextension is limited primarily by limitations of the hip ligaments. The appearance of greater hyperextension is gained by a forward tilt of the pelvis. Howley and Franks (1986) suggest that caution be raised to keep the pelvis in proper alignment.

Hip and Thigh Stretch. Kneel on the right knee. Flex the thigh of the left leg so that the left knee is directly above the left ankle and the foot is flat on the floor. Slide the right leg backward while the knee is on the floor until a stretch is felt in the quadriceps. Hold the trunk in an upright position. Reverse position and alternate legs.

Back Lying-Hip Extension. Lying on the back with both knees flexed and feet on the floor, the right knee is brought toward the chest and extended vertically toward the ceiling. Additional stretch may be placed on the hamstrings by grasping the toes and pushing the heel toward the ceiling. This action also stretches the calf muscles. Repeat with the other leg.

Head to Knee Touch. Sit on the floor with legs extended and about 3 feet apart. Flex at the left knee and point the toes slightly outward. Keep the right leg extended and reach forward with both hands and grasp the shin. Pull forward with the arms to lower the head toward the knees. Reverse position and repeat to the other side.

Nose Touch and Extension. The athlete rests on all fours, brings one knee close to the nose, and extends the same leg backward and parallel to the

Figure 5. *Hip and thigh stretch.*

floor. Do not go beyond the parallel position and induce back hyperextension.

Wall Lean. Stand and face a wall about 2–3 feet from it. Point the toes inward slightly. Place the hands on the wall and lean forward, allowing the forearms to rest against the wall. Keep the heels on the floor, legs straight, and buttocks tucked in.

Calf Stretcher. Stand and take a forward-backward stride with the left leg forward. Allow the left knee to flex slightly and extend the right leg while keeping the heel on the floor. Point toes straight ahead. Reverse position and repeat to the other side.

Back Lying-Hip Extension. Refer to the description on previous page.

Summary

The first steps in developing a stretching program for athletes is to determine the muscles which need stretching and the exercises most suited to accomplish the purpose. Choosing exercises which are safe for the entire team to use is important. Avoidance of those exercises which are contraindicated is essential. Static stretches are preferred.

The following exercises stretch the muscles most commonly used by basketball players and provide a balance among opposing muscle groups. Use of these exercises throughout the season should decrease muscle soreness and other minor muscle injuries.

Figure 6. *Head to knee touch.*

Neck
Neck circling
Neck rotation

Trunk
Side stretch
Trunk twist

Lower Back
Inverted bicycling
Knee pull down
Wall curl
Knee flex and extend
Reverse sit-ups

Groin
Groin stretch

Chest and Arms
Pectoralis stretch
Shoulder stretch
Arm stretch

Quadriceps
Hip and thigh stretch

Hamstrings
Back lying-hip extension
Head to knee touch
Nose touch and extension

Calf (Gastrocnemius, Soleus)
Wall lean
Calf stretcher
Back lying-hip extension

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Strength and Conditioning for Women Basketball Players

MaryBeth Horodyski, Amanda B. Hopkins, and Thomas J. Koesterer

Women's basketball is a very physically demanding sport. The game consists of constant motion in which the players are involved in running, jumping, sudden starts and stops, quick changes of direction and speed, defensive sliding, and defensive and offensive strength at the boards. Playing basketball at optimum intensity requires the athlete to be conditioned to withstand the physical stress of the game.

A total conditioning program includes speed (quickness and agility), aerobic training, muscular strength, muscular power, and flexibility. The key to a sound conditioning program is to incorporate these elements to improve the weaknesses of the team and to capitalize on the strengths. Overuse injuries may occur with this type of intensive training. If stress reactions or injuries begin to occur, workouts should be discontinued until medical personnel are consulted. As with any conditioning program, the exercises recommended here are suggestions and should be adapted to meet the needs of the individual and the team.

Flexibility

Flexibility is the ability to move a joint through its full range of motion. Limited flexibility can result in restricted movement and possible injury. The major limitation to flexibility is the tightness of the soft tissue structures (muscle

and its fascia, tendons, and joint capsule). It is important to know that temperature affects flexibility. Therefore, it is important to warm up prior to performing flexibility exercises. An adequate warm-up might include a quarter mile brisk walk followed by a quarter mile jog.

Slow, static stretching is preferable to ballistic stretching because there is less chance of muscle soreness and injury. In slow, static stretching the muscle is stretched with the joint positioned at the extreme end of the range of motion. This position is held for six to ten seconds at the initiation of a flexibility program and increases to 30 seconds as the program progresses. The intensity of the stretch should be just below the pain threshold (i.e., the stretch is uncomfortable, but not painful). Two to four repetitions of each exercise should be performed. Flexibility exercises are joint specific. Thus, stretching exercises must be selected for the joints involved in basketball.

The following flexibility exercises are suggested: modified hurdlers stretch, butterfly (groin) stretch, forward lunge (hip flexors), wall stretch (calf region), straddle stretch, knee to chest (low back), and pretzel stretch.

Strength Training

Basketball involves many skills where strength is needed. The ability to jump higher, maintain defensive stance, get off the boards faster, and recover from offense to defense faster all necessitate the need for a good strength training program. The fault of many strength training programs is the inability to transfer the gained strength into improved athletic performance.

The strength training program should be designed using the basic principles of weight training. These principles are specificity, progressive resistance, overload, and arrangement of exercises. The development of muscular strength is specific to the muscle group that is exercised (specificity). As the strength training program continues, the workload must be increased progressively to continue to overload the muscle. The overload principle has been stated in various ways, but simply put, a muscle must be exercised with a work load that is greater than that of normal daily activity to develop strength. The order in which the exercises are performed is important to allow for recovery and to prevent undue muscle fatigue. The most common approach is to exercise the large muscle groups first and progress to the smaller.

With jumping being a primary skill in basketball it is important to know what body segments contribute to the actual performance of the skill. The force produced by the hip extensor muscles accounts for 60% of the force needed to perform the vertical jump. The knee, ankle, and upper trunk account for

approximately 20%, 10%, and 10%, respectively. Thus, a strength training program geared toward improving jumping height should include exercises that will emphasize those muscle groups as well as include additional exercises to develop a total strength training program.

The number of exercises, sets, and repetitions to be performed is always of debate. The workout should be limited to 12 to 14 exercises. It is recommended that emphasis be placed on the muscles of the lower body to improve jumping height. A program of one set of 8 to 12 repetitions will build a sound strength foundation for most athletes. The amount of weight for each exercise should be set to allow for eight repetitions to be completed. When 12 repetitions can be completed for a given exercise, the weight should be increased. The exercise should be performed three times a week during the preseason and two times a week during the season. The type of equipment used for a strength training program is not as important as the intensity at which the exercise is performed.

Recommended exercises for free weights, Universal, Nautilus, and partner resistive exercises are given in Tables 1 and 2. Explanations of specific lifting techniques are not included, but the coach may refer to numerous strength training manuals.

Plyometrics

Plyometric exercises are an extremely effective way to develop power. Plyometrics is defined as power training exercises characterized by strong muscular contractions in response to rapid load bearing. Strength is key and essential in performing plyometrics. A strength program should complement the plyometric program since lack of strength may result in injury. A proper foundation must be built first.

Plyometric exercises are performed quickly, and with maximal effort per repetition. Generally, two sets of 8 to 10 repetitions are performed a maximum of two times per week, and only three or four exercises are performed per workout. An essential component for this type of exercise is an adequate warm-up. The following plyometric exercises can be used to help increase vertical leap and other components of basketball.

Double Leg Box Bound. This exercise requires two to four boxes placed three to six feet apart. Jump up onto the first box. As soon as you land explode upward again landing as far out as possible. This is repeated for each box. The box height should range between 12 to 22 inches.

Table 1. Strength training exercises for the lower body (from Peterson, J. A., & Horodyski, M. B., *How to jump higher*, 1988).

Lower Body Muscles	Exercises			
	Free Weights	**Universal**	**Nautilus**	**PR Exercises**
Erector Spinae	Squat Bent-legged Dead Lift Stiff-legged Dead Lift Good Morning Power High Pull	Back Extension	Hip Extension	BackMate® Squat Back Extension
Buttocks	Squat Bent-legged Dead Lift Leg Press (AMF) Lunge Jump Squat Step Up Stiff-legged Dead Lift	Leg Press	Hip Extension Leg Press Hip Abduction	BackMate® Squat Leg Press Hip Abduction
Quadriceps	Squat Bent-legged Dead Lift Leg Press (AMF) Lunge Jump Squat Step Up Power High Pull Power Clean	Leg Extension Leg Press	Leg Extension Leg Press Hip Abduction	Leg Press
Hamstrings	Squat Stiff-legged Dead Lift Leg Press (AMF) Lunge	Leg Curl	Leg Curl	Leg Curl Squat
Hip Flexors	Step Up			Hip Flexion
Hip Extensors	Squat Power High Pull Power Clean			
Calves	Heel Raise Stiff-legged Dead Lift Power High Pull Power Clean	Heel Raise	Heel Raise	Heel Raise
Adductor Magnus			Hip Abduction	Hip Abduction

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Table 2. Strength training exercises for the upper body (from Peterson, J. A., & Horodyski, M. B., *How to jump higher*, 1988).

Upper Body Muscles	Exercises			
	Free Weights	**Universal**	**Nautilus**	**PR Exercises**
Deltoids	Upright Row Bench Press	Upright Row Bench Press	Arm Cross Rowing Torso	Bent-arm Fly Front Raise Bent-over Side Lateral Raise Seated Press Back Pulldown
Trapezius	Power High Pull Power Clean Upright Row Shoulder Shrug	Upright Row Shoulder Shrug	Shoulder Shrug	Shoulder Shrug Bent-over Side Lateral Raise
Rotator Cuff				Internal Rotation External Rotation
Rhomboids	Bent-over Fly		Rowing Torso	Back Pulldown Bent-over Side Lateral Raise
Latissimus Dorsi	Chin-up Bent-over Rowing Bent-over Fly	Lateral Pulldown	Chin-up Pullover	Lateral Pulldown
Pectorals	Bench Press	Bench Press	Arm Cross	Bench Press Bent-arm Fly Front Raise
Biceps	Chin-up Bent-over Rowing Bicep Curl Power High Pull Power Clean	Upright Rowing Bicep Curl Lateral Pulldown	Chin-up Two-arm Curl	Bicep Curl Lateral Pulldown Back Pulldown
Triceps	French Curl Bench Press	Tricep Extension Bench Press	Tricep Extension	Tricep Extension Bench Press Seated Press
Forearm Extensors/ Flexors	Wrist Curl Reverse Wrist Curl	Wrist Curl Reverse Wrist Curl	Wrist Curl Reverse Wrist Curl	

Note. *The power clean, power high pull, and the jump squat are fairly popular, yet highly dangerous exercises. The authors caution athletes to strictly adhere to proper techniques while performing these exercises.*

Incline Bound. Stairs are generally used for this drill, but it may also be performed on a sloped hill. This drill is begun in the half-squat position. Jump upward and outward using an upward arm swing, landing on the next step up, or farther up the hill.

Single Leg Speed Hop. In this exercise one leg is worked at a time. Assume an upright stance with feet shoulder width apart. Lift one foot off the ground. Jump upward and outward driving off with one leg. Land only on the same leg, and jump up again. Complete eight repetitions and then switch legs. Your arms should be swung in an upward motion to aid height and distance.

Squat Jumps. Begin by dropping quickly into a half-squat. Immediately drive upward. Upon landing repeat this procedure.

Box Jumps. Only one box is needed per person for this drill. Boxes may be used by more than one person by alternating turns. Jump up onto the box and immediately jump back down to the original starting position. Repeat this procedure. This drill can be varied by alternating the direction of jumping on and off the box.

Single Leg Stride Jump. Bleachers or a long sturdy bench work best for this exercise. Stand alongside the bench. Place the inside foot on top of the bench. Using the *inside* foot for power jump upward as high as possible. Repeat this action along the length of the bench. Remember to switch legs after eight repetitions.

Propulsion Jump. A box or bench should be used for this exercise. You will be working across the *width* of the box. Stand on one side with your inside foot on the box. Drive upward using the inside leg for power and swinging the arms upward. Land on the other side of the box so that the opposite leg will push off next. Achieving maximum height for each jump is the goal of this exercise.

Quick Leap. This drill is performed by quickly leaping on to a box, exploding off the box, and jumping as high and landing as forward as possible. Repeat this exercise in rapid succession.

Incline Ricochet. Using a set of stairs, move up every step as quickly as possible without tripping. Quickness is the key for this exercise.

Medicine Ball Chest Press. This exercise is used to develop upper body strength and power. With a partner toss the ball back and forth quickly, yet safely. Do not let arms collapse upon receiving the ball before tossing it back.

Running Program

The running phase of a conditioning program will help develop three important aspects of your game: speed and quickness, muscular endurance, and

cardiorespiratory endurance. Three modes of running will be used to develop these aspects: sprints and quickness drills (SQ), intervals (INT), and long slow distance (LSD). Only one type of running will be completed on a given day. Sprints and quickness drills will be completed twice per week, and on the same days as plyometric training. Intervals will be completed once per week, and LSD will be completed three days per week. Days will alternate between SQ and INT days and LSD days. The following outline lists running and plyometric activities for each day.

Weekly Schedule

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
SQ	LSD	INT	LSD	SQ	LSD
PLYO				PLYO	

Each mode of running will consist of different exercises. A coach may decide between one, two, or possibly three exercises for a given day. The intensity, work/rest ratio, and total time of each workout will dictate whether one, two, or three exercises may be performed. Plyometrics should be considered as one workout in the running phase for a SQ day, and LSD days should consist of only one running exercise. Example exercises for each mode of running follow.

Sprint and Quickness Drills

These drills are designed to transfer the strength gained through weight training into speed and quickness. These exercises should be performed with sufficient rest to allow athletes to perform each sprint or drill at maximum speed. Progression in sprint and quickness drills is achieved by increasing the number of repetitions and reducing the rest time between repetitions for each successive workout.

Sprints. Sprints may be performed at any distance from 10 to 400 meters. It is a good idea to decide on a few set distances for your program in order to perform periodic evaluations of time for those distances (e.g., 40, 100, 200, and 400 meters).

Two, Four, and Sixes. These sprints are completed by running a specified number of lengths on the court. The numbers should be varied during a workout. A sample workout should be: 2-Twos, 1-Four, 1-Two, 1-Six, and 2-Twos.

Progressions. Progressions are performed by starting at one end line, running and touching a designated series of lines on the court, while returning to touch the end line between each touch of the designated line. The most common series of lines used are foul line, mid-court line, opposite foul line, and opposite end line.

Forward and Backward Progressions. These sprints are performed using the same series of lines as above, but run forward to the first line, backward to return to end line, then forward again to next line, and so on.

Three Line Shuffle. The three line shuffle is performed on three lines spaced evenly about three to four feet apart. The athlete stands straddling the center line, then begins by shuffling to the right or left until straddling one of the outside lines, then back in the opposite direction, and so on. This drill may be for either a set amount of time or number of repetitions.

Box Drills. Box drills are performed on a designated square on the court. The size of the square may vary from 5 to 20 yards. The athlete starts running forward up one side of the square, shuffles across the top, runs backward down the opposite side, and shuffles across the bottom.

Intervals

Intervals are a series of sprints alternated with running. They are an excellent method of training used to increase an athlete's muscular and cardiorespiratory conditioning. Intervals can be set up in a variety of patterns. When designing an interval workout, the sprint to run ratio is important to consider. A 1:1 ratio will provide a greater percentage of muscular and cardiorespiratory conditioning, while a 1:3 ratio will provide a greater percentage of speed training. Since this conditioning program contains two speed training days, the interval day should remain near a 1:1 ratio. Interval training is progressed by increasing the distance and number of repetitions in each successive workout.

Track Intervals. Track intervals are an excellent way to obtain an intense workout and get your athletes off the court. A 1:1 ratio may be achieved by sprinting a set distance followed by jogging the same distance. Some common distances on a track would be 100, 200, 300, and 400 meters. A series of distances should be designated, in order to provide a complete workout. A pyramid design is a common example; 100, 200, 300, 400, 300, 200, and 100.

Court Intervals. Court intervals are easy to design because the distances are already marked on the court. The easiest court interval to design is the sprint one lap, run one lap. A few other examples are: sprint the diagonal and jog the straight; sprint half a lap, run half a lap; sprint the end line, run the side line; or sprint the side line, run the end line.

Long Slow Distance

LSD is used to maintain and increase an athlete's cardiorespiratory endurance. Workouts can be designated by either a set distance (two or more miles) or a set time (20-30 minutes). Progression in LSD is accomplished by increasing the distance or time of running for each successive workout.

The authors have designed a complete conditioning program for women basketball players. It is our intent that this program be adapted by the coach to meet the needs of the team.

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A Century of Women's Basketball

Joan S. Hult and Marianna Trekell, Editors

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